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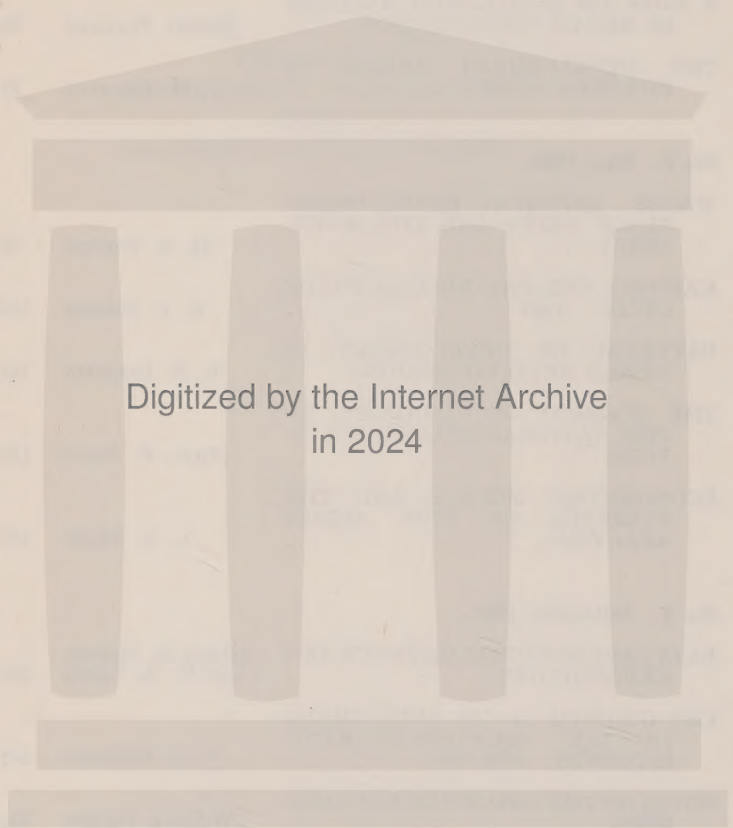
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CONTENTS

		<i>Page</i>
No. 1. January, 1956.		
THE CLIMACTERIC OF THE 1890's: A CRITICAL NOTE	D. J. COPPOCK	1
SOME ASPECTS OF BUILDING SOCIETY FINANCE	G. W. MURPHY	32
A WOMEN'S CLOTHING MULTIPLE ..	M. J. WRAY	47
A NOTE ON MANAGERIAL INCOMES IN RETAIL DISTRIBUTION ..	SIDNEY POLLARD	68
THE DEVELOPMENT AREAS: A FURTHER NOTE	J. H. DUNNING	77
No. 2. May, 1956.		
WAGES: INDUSTRY RATES, WORK- PLACE RATES AND THE WAGE- DRIFT	H. A. TURNER	95
EXPORTS AND THE BRITISH TRADE CYCLE: 1929	D. C. CORNER	124
PATTERNS OF DEVELOPMENT IN NEWLY SETTLED REGIONS ..	R. E. BALDWIN	161
THE ELEMENT OF "ACCIDENT" IN THE NATIONAL SALARY STRUC- TURE	HILDA R. KAHN	180
ECONOMETRIC MODELS AND THE EVIDENCE OF TIME SERIES ANALYSIS	L. R. KLEIN	197
No. 3. September, 1956.		
PATTERNS OF PUBLIC REVENUE AND EXPENDITURE	ALISON M. MARTIN AND W. A. LEWIS	203
THE GROWTH OF U.S. INVESTMENT IN U.K. MANUFACTURING INDUSTRY, 1856-1940	J. H. DUNNING	245
NOTES ON THE THEORY OF REPLACE- MENT	WILLIAM PETERS	270
HOUSE BUILDING IN THE SOUTH WALES COALFIELD, 1851-1913 ..	HAMISH RICHARDS AND PARRY LEWIS	289



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The Climacteric of the 1890's: A Critical Note

I.

The purpose of this article is to criticise the arguments put forward by Professor E. H. Phelps Brown and Mr. S. J. Handfield-Jones in their interesting and provocative article "The Climacteric of the 1890's: A Study in the Expanding Economy."¹

The main propositions of the theory of the climacteric of the 1890's might be set out as follows.

- (1) That the period 1890-1900 in the British Economy is associated with a break in trend in industrial productivity and real income a head. In the case of industrial productivity there is a marked slowing down of the previously rising trend after 1885. In the case of real income a head a rapid rise before 1899 is succeeded by little or no rise in trend between 1899 and 1913. This holds even when national income is adjusted to exclude the effects of property income from abroad and changes in the terms of trade. The causes of the check to real income a head must therefore be sought in productivity within the United Kingdom.²
- (2) The check to the growth of productivity cannot be fully explained by deficiencies of management and labour. Nor was it associated with a similar check to capital accumulation. Capital a head continued to rise between 1900 and 1913.³
- (3) Since the check to the growth of productivity and real income a head cannot be explained in terms of the above factors an explanation must be sought elsewhere. The authors find the answer in the process of innovation.

¹*Oxford Economic Papers*, October, 1952, pp. 266-307. See also E. H. Phelps Brown and B. Weber: "Accumulation, Productivity and Distribution in the British Economy, 1870-1938," *Economic Journal*, June, 1953, pp. 263-288.

²*Oxford Economic Papers*, pp. 267-273 and 289-290.

³*Op. cit.*, pp. 279-281, 283-286 and 289-290.

The period 1890-1900 marks the end of the "massive application" of the techniques of Steam and Steel and this is held to be the main factor causing the decline in the rate of growth of productivity.¹

The argument of the following paper is that the above propositions cannot be accepted entirely as valid inferences from the data. Specifically the following suggestions will be made.

- (1) That a genuine climacteric, or break in trend, in the growth of industrial productivity did occur in the British economy in the 19th Century but that the date of this phenomenon must be set in the 1870's rather than the 1890's.
- (2) That the genuine check to the growth of real income a head after 1900 is not explained in terms of changes in productivity resulting from capital formation. The series in question is an index of changes in the buying power of national income a head rather than of changes in output a head. The character of the changes in their estimate of real income a head during the period 1870-1913 is, therefore, largely explained in terms of changes in the price of food and raw materials relative to other prices but also reflects the secular swing of the building cycle.
- (3) That the causes of the climacteric are connected with a decline in the rate of growth of industrial capital per head after the 1870's. The low rate of capital accumulation is explained partly by an exogenous decline in the rate of export growth, which reduced the incentive to invest, and partly, as Professor Phelps Brown and Mr. Handfield-Jones suggest, by changes in innovation, the relevant innovations being steam and iron rather than steam and steel. These factors may have been reinforced by a decline in efficiency of entrepreneurship in certain industries. The ending of the massive application of steel, if it occurred in the 1890's, is not associated with any significant decline in the growth of productivity.

¹*Op. cit.*, pp. 282-3 and 290.

II.

The main evidence for the "climacteric," as presented by Professor Phelps Brown and Mr. Handfield-Jones, is derived from two statistical series. The first is the Hoffmann index of industrial production (without building) divided by a suitable employment figure obtained from Census of Population data. The second is Mr. Prest's figure for the current value of national income divided by estimates of the occupied population and a price index of final products. Objections may be raised against both these series but it will be convenient to examine first the nature of the trends which they seem to display.

Professor Phelps Brown and Mr. Handfield-Jones suggest that the two series display the following trends.

- (1) The Industrial productivity series shows a nearly linear trend from 1860-85 during which time the index rose by about a third. After 1885 the trend maintains a barely rising course to 1914.¹
- (2) Real income a head adjusted to exclude property income from abroad and changes in the terms of trade rises rapidly from 1870-1900 after which there is an abrupt check, the index first falling and later rising but failing to recapture the 1899 level by 1912. In the case of the unadjusted index the check to trend after 1900 is smaller but still noticeable.²

The authors' figures are displayed in graph form which does not eliminate the effects of the short trade cycle. Perhaps the secular implications of the series are more clearly shown if the figures are expressed in the form of intercycle growth rates *i.e.*, in the form of mean logarithmic growth rates from

¹*Op. cit.*, p. 271.

²*Op. cit.*, pp. 267-271 and pp. 294-5. There seems to be no explicit verbal statement of the pattern of the unadjusted index but the above sentence is perhaps a fair description of the trend as derived from the graphs and statistical appendix and the discussion in the text.

one trade cycle (geometric) average to the next.¹ The results are as follows.

INTERCYCLICAL AVERAGE ANNUAL GROWTH RATES

				Industrial Productivity	Real Income a Head
				%	%
1861/65 to 1866/74	...	...	...	2.5	—
1866/74 to 1875/83	...	...	...	0.9	2.0 ⁽¹⁾
1875/83 to 1884/89	...	...	...	0.2	1.7
1884/89 to 1890/99	...	...	...	0.4	1.5
1890/99 to 1900/07	...	...	...	0.2	0.2
1900/07 to 1908/13	...	...	...	-0.2	0.2 ⁽²⁾

(¹) 1870/74 to 1879/83 only. This seems better than taking the rate of growth from the boom years only of one cycle to the whole of the next one.

(²) Ending 1908/12.

The abrupt change in trend after 1900 in the series for real income a head is most noticeable but this feature is not present in the series for industrial productivity. It is true that the last two intercyclal growth rates indicate a small decline in the trend value but this can be explained by a defective estimate for employment, to be considered later, and by the fact that the last cyclical period is artificially terminated by the commencement of the first world war. The outstanding feature of the industrial productivity series is the break in trend after 1866/74 which is so great as to merit further analysis. Between 1875 and 1900 the two series are quite contradictory.

The divergence between the two series for the 1880's and 1890's was noted by Professor Phelps Brown and his colleague ² but they concluded that the main impression was one of agreement between the two series. Both series admittedly exhibit an abrupt change in trend but they disagree on its

¹This is the method used by Professor W. A. Lewis in his *Economic Survey*, 1919-1939 (London, George Allen and Unwin, 1949), to which I am greatly indebted. I have used the same dates for the short cycle as Professor Lewis, who adopted the dating given by Lord Beveridge in *Full Employment in a Free Society*. Professor Lewis has drawn my attention to the limitations of this method; e.g. the intercyclal growth rate may indicate continued growth even though the index may decline absolutely for part or whole of the second cycle. I do not think that this sort of feature invalidates the subsequent argument at any point.

²*Op. cit.*, p. 273.

dating by some 20-25 years. Some resolution of this difference seems to be required or we shall be faced with the need to recognise two climacterics. Reasons will be given later for rejecting the real income a head series as a measure of productivity. For the present attention will be concentrated on the series for industrial productivity which seems to suggest the existence of a climacteric in the 1870's.

Professor Lewis has already shown that, as far as *production* is concerned, the 1870's mark the division between two distinct periods in the growth of the British Economy in the 19th Century. Before 1870 Industrial production grew at a cumulative annual rate of approximately 3.3% per annum. After 1870 the rate of growth fell to about half that value. A similar break in trend may be seen in imports and exports, the average rate of growth again being nearly halved.¹ The fact that the dates 1818-1855 mark the period of maximum growth in British industrial production, the rate falling away on either side (except for a short period from 1780 to 1792) has been noted by Professor Hoffmann² who has also stated

The relatively greatest expansion in output per head occurs between 1850 and 1880 and more particularly between 1850 and 1870.³

Professor Hoffmann's quotation is, however, based on observations of production for Census years only and the measure of employment is "total industrial employment" in England and Wales, the meaning of which is not clear. It is natural to ask if the feature noted by Professor Hoffmann is maintained when the more comprehensive intercycle growth rates of his index of production are deflated by the rate of growth of a comparable labour force as estimated from the data supplied by Professor Phelps Brown and Mr. Handfield-Jones and from earlier estimates on a similar basis.

An attempt has been made to estimate the number of operatives engaged in the industries covered by the Hoffmann

¹*Cf. Lewis op. cit.*, pp. 74-5 and Statistical appendices.

²Walther Hoffmann, *Wachstum und Wachstumsformen der Englischen Industriegewirtschaft von 1700 bis zur Gegenwart*, (Jena, Gustav Fischer), 1940, English translation by Dr. W. O. Henderson and Dr. W. H. Chaloner (Blackwell), 1955, pp. 31-33. I am obliged to my colleagues for their kindness in allowing me to consult their translation before its publication.

³*Op. cit.*, p. 40.

index for 1841 and 1851, from Census data, following as closely as possible the headings used by Professor Phelps Brown and his colleague in their Appendix B, Table III, series 4. Naturally such estimates will be erroneous because of the numerous headings and the element of personal judgment involved in selection. However, an estimate for 1861 on the basis used differs from their total by less than 1%* which in view of the general accuracy of the estimates may be disregarded.¹

The resulting totals are (000's),

1841 .. 1,464

1851 .. 2,165

1861 .. 2,381 (Phelps Brown, 2,364)

These give growth rates of 4.0% and 0.9% per annum. The growth rate for 1861/71 using Professor Phelps Brown's estimates is 1.1% per annum. The rate for 1841/51 is obviously wrong and must imply a considerable understatement of the numbers employed in the 1841 Census. This Census shows that the total occupied population was 37% of the total population as compared with 46% in the 1851 Census. It is inconceivable that the occupied population should have grown so rapidly.²

¹It did not prove difficult to match practically all the groups listed by Professor Phelps Brown (p. 299, O.E.P.) Food manufacture provided the most difficult task and I have included only millers, bakers and sugar refiners. I did not include gunsmiths, swordsmiths and watch-makers which the authors include in their main series 4 although they exclude it from the sub-group iron and steel manufactures. Also nail manufacture was excluded though it featured in the same sub-group but not in the main series. One or two other difficult cases may have been included or excluded erroneously but their aggregate effect will not be significant.

²Grounds for rejecting the 1841 Census are as follows : (1) The percentage of population occupied in 1851 compares reasonably with those of subsequent Censuses when allowance is made for changes in treatment of retired persons and female relatives of farmers. (2) For the period 1851 to 1911 the rate of growth of total occupied population follows very closely that of total population for the previous decade. On this basis the growth of occupied population from 1841 to 1851 should be about $1.4\% \pm 0.2\%$ per annum. (3) The 1841 Census of occupations was a new departure since, for the first time, the occupations of all members of the population were to be listed instead of, as previously, only males above the age of 20. In fact this seems to have been done badly and the occupations of many women and children must have failed to be enumerated. The Census of 1841 shows a lower proportion of males and females under 20 occupied than that of 1911 although in the intervening 70 years there had been a notable reduction in child labour. It seems likely, also, by comparison with 1851, that even in the group males aged 20 and above there was incomplete enumeration. Professor Hoffmann has also challenged the accuracy of the 1841 Census. See *op. cit.*, p. 38.

The incomplete enumeration of occupations of the 1841 Census unfortunately sets a limit to the possible backward extension of the measure of productivity growth. If, however, the intercyclal measures are taken back as far as the period beginning in 1847 a period of length sufficient to test the validity of the break in trend in the 1870's will be available. It seems best to take the rate of growth of employment in the Hoffmann industries for the whole period 1847 to 1860 as being the same as that estimated by Professor Phelps Brown for the period 1861/71, *viz.*, 1.1% per annum. For the period 1851/61 this will, if anything, slightly overstate the growth of employment and therefore put a bias against the proposition which it is desired to establish.

On this basis the intercyclal growth rates of production, employment and productivity may be set out as follows. The productivity figures are also shown corrected for the intercyclal changes in the general unemployment percentage from 1854 onwards, which in most cases was not important; it does however introduce a little smoothing into the trend and can be accepted or disregarded according to taste.

INTERCYCLAL AVERAGE ANNUAL GROWTH RATES

	Industrial Production Excluding Building	(¹) Employ- ment	Product- ivity	Productivity (Corrected for Unemploy- ment)
	%	%	%	%
1847/53 to 1854/60 ...	3.5	1.1	2.4	2.4 (a)
1854/60 to 1861/65 ...	1.7	1.1	0.6	0.6
1861/65 to 1866/74 ...	3.6	1.2	2.4	2.2
1866/74 to 1875/83 ..	2.1	1.3	0.9	1.0
1875/83 to 1884/89 ...	1.6	1.4	0.2	0.5
1884/89 to 1890/99 ...	1.8	1.4	0.4	0.1
1890/99 to 1900/07 ..	1.8	1.5	0.2	0.2
1900/07 to 1908/13 ...	1.5	1.7	-0.2	-0.1

(a) Uncorrected

- (¹) The intercyclal growth rates for employment were calculated by using suitable weighted averages of the inter-censal growth rates based on the estimates of Professor Phelps Brown and Mr. Handfield-Jones. The rate for 1871/81 was raised by 2% to allow for the changed treatment of retired persons in 1881. See discussion in text below.

These figures suggest that industrial productivity was growing at a more rapid rate before the 1870's than subsequently. Unfortunately the pattern is distorted by the effects of the "cotton famine" which are seen most clearly in the second intercyclical period. For 1861/5 Hoffmann's index of output in the cotton industry stands at about 30% below the average level for 1854/60. The weighting of the industry is sufficiently high (about 18% of total) for the effect to produce a significant check to the rate of growth of the aggregate index. Also, in the following period the intercyclical growth rate is raised by the relatively high growth rate in cotton as output recovered from the abnormally low level. Unfortunately it is not possible to compensate for this distortion in the aggregate index since no measure of unemployment for the cotton industry is available. It is necessary, therefore, to present the growth rates of production and productivity for an index which excludes the cotton industry, though this reduces the industrial coverage of the indices. The rates are as follows.

INTERCYCLICAL AVERAGE ANNUAL GROWTH RATES

	(¹) Ind. Pro- duction Excluding Building & Cotton	(²) Employ- ment	Product- ivity	Productivity (Corrected for Unemploy- ment)
	%	%	%	%
1847/53 to 1854/60 ...	3.0	0.9	2.1	2.1 (a)
1854/60 to 1861/65 ...	3.5	1.2	2.3	2.3
1861/65 to 1866/74 ...	2.8	1.5	1.3	1.1
1866/74 to 1875/83 ...	2.1	1.5	0.6	0.7
1875/83 to 1884/89 ...	1.6	1.6	0.0	0.3
1884/89 to 1890/99 ...	2.0	1.6	0.4	0.1
1890/99 to 1900/07 ...	2.0	1.7	0.3	0.3
1900/07 to 1908/13 ...	1.5	1.8	-0.3	-0.2

(a) Uncorrected.

(¹) The index was calculated as follows. The annual figure for the index without Building was adjusted to exclude cotton yarn and cotton weaving in accordance with Hoffmann's weights for the appropriate sub-period. It should be noted that in the translation Professor Hoffmann has corrected the formula for the calculation of his index which appeared in the original book.

(²) My estimates of cotton operatives are : 1851, 490,000 ; 1861, 540,000 ; The employment rates were calculated as before.

The removal of cotton has the effect that the sharp break in the intercyclical measures of productivity growth occurs in the period ending 1866/74 rather than the period ending 1875/83, which suggests that the decline in trend may have set in as early as the late 1860's. It would be wrong to try to be too precise about the dating of this phenomenon in view of the roughness of the basic data, which can only provide an approximation to the rate of growth of gross productivity of labour. It seems best, therefore, to interpret the figures cautiously as indicating a difference in the order of magnitude of the growth of productivity during two relatively long periods. For some 20 years before 1870 the growth rate was relatively high ; for some 30 years after 1880 the growth rate was relatively low. The 1870's (including perhaps some overlap on either side) represent a period of transition showing a definite fall in the rate of growth as compared with previous years but with a rate still higher than that of the subsequent period. Given that the trend in production is similar it seems reasonable to describe such a period of transition as a climacteric, or period of declining vital force, in British industrial progress. The question must now be raised whether the statistical defects of the basic series are so great as to invalidate this conclusion.

Criticism of the Hoffman index of production cannot be based on the extent of the industrial coverage which is generous. In the period under review Hoffman estimates that some 74%–68% of British industry is covered.¹

The objection is that a large proportion of the index is based on input rather than output data. For the period 1831/90 about 70% of the index consists of measurements of inputs of raw materials and for the period 1891/1913 the percentage is 53. In some cases, *e.g.* the group Iron and Steel goods, machinery and tools, the measure is very approximate as Professor Hoffmann admits.² An index so heavily weighted by raw material inputs will understate the rate of growth of production for two reasons. First, assuming no change in final product there is likely to be a secular trend towards economy

¹*Op. cit.*, p. 19, of which cotton accounts for some 14%, (1850-90) and 7.5% (1891-1913).

²*Op. cit.*, p. 238.

of raw materials. Secondly, technological progress will involve increasing fabrication as more elaborate and valuable final products are produced with given inputs of raw materials. It is doubtful if changes of the first type will seriously affect the trend value of the Hoffmann index and they will hardly explain the major sort of break in trend which is discussed. On the second type it is difficult to generalise. The work of Tolles and Douglas¹ makes it seem that between 1907 and 1924 the Hoffmann index under-estimates the rate of growth by as much as 1% per annum cumulatively. But even if their figures are accepted without question there is nothing to show that the error in the Hoffmann index is progressive between the two dates; it may be explained by the inability of the index to deal with the structural changes which occurred in the war and early post-war periods. A comparison of the Hoffmann index with indices based on Census of Production data for the inter-war period does not suggest any great degree of understatement. Professor Devons has estimated that the increase in industrial production between 1924 and 1935 was about 29%.² The Hoffmann index gives an increase of 26%. Part of the discrepancy is explained by the presence in Professor Devon's index of building which increased by about 60%. Until a better index is available it seems permissible to make cautious use of the Hoffmann index as it stands.

The estimates of the number of operatives in the Hoffmann industries are defective on a number of points.

- (1) Professor Phelps Brown and Mr. Handfield-Jones have estimated the relevant labour force for Great Britain whereas the Hoffmann index relates to the whole of the United Kingdom.³ This discrepancy will not be serious in view of the small relative size of Irish industry except in the case of linen.
- (2) Apart from errors of enumeration in the Census tables the distribution of population is by occupations rather

¹N. A. Tolles and P. H. Douglas, "The Measurement of British Industrial Production," *Journal of Political Economy*, 1930.

²E. Devons, "Production Trends in the United Kingdom," *Transactions of the Manchester Statistical Society*, 1938-9.

³Hoffmann, *op. cit.*, pp. 39, 227.

than by industries, the latter being the relevant one for productivity discussions. However, as Professor Robinson points out,¹ before 1911 the occupational distribution was largely an industrial one.

- (3) Before 1881 persons described as retired from any occupation were included in the occupational heading : from 1881 onwards they were excluded. This has the effect of lowering the apparent growth rate of employment for the decade 1871/81. As a partial correction of this error the growth rate for the decade was raised by 2% when calculating the intercyclal growth rates. This adjustment was suggested and used by the Census Commissioners for England and Wales in 1881.²
- (4) Before 1881 clerks, porters, engine drivers, etc., had been nominally classified industrially under the separate trade or manufacture with which they had been concerned ; after 1881 they were classified separately. Actually, a large proportion must have been separately recorded before 1881.³ Correction of this error, if it could be made, would operate, as in the previous case, to raise the growth rate of employment from 1871 to 1881.
- (5) As Professor Phelps Brown points out, an upward bias is introduced into his measure of operatives by the progressive absorption into particular categories of previously unclassified general labourers as the Census was improved through time. *
- (6) In the absence of adequate data no correction is made for changes in hours of work.

It is doubtful if the defects listed seriously invalidate the measurement of the trend of employment for the large group involved in the Hoffmann industries. Where the direction of the error is known as in points (4) and (5) the correction of the error would actually help the argument. Correction of (4) would lower the growth rate of productivity for the period

¹E. A. G. Robinson, "The Changing Structure of British Industry," *Economic Journal*, September, 1954, p. 459.

²*Cf. Census of England and Wales, 1881, Report*, Vol. IV, p. 29.

³*Cf. Robinson op. cit.*, p. 459.

1866/74 to 1875/83 and sharpen the contrast between the two periods of growth. Correction of (5) would probably eliminate the minor decline in trend in the last intercyclical period. If small changes in the trend are ignored we are left with the striking contrast in the order of magnitude of the growth rates of production and productivity before and after the 1870's.

The discussion so far relates to aggregate industrial production which is significantly weighted by coal-mining (12%, 1831-60 rising to 22%, 1891-1913). Since it is well known that a decline in productivity occurred in this extractive industry towards the end of the 19th Century ¹ it is advisable to present the growth rates of production and productivity when coal-mining has been excluded, that is, for a series relating mainly to manufacturing production.² Cotton will again be excluded since with coal-mining removed its distorting influence increases.

INTERCYCLICAL AVERAGE ANNUAL GROWTH RATES

	(¹) Production Excluding Building, Cotton and Coal	(²) Employ- ment	Product- ivity	Product- ivity (Corrected Unemploy- ment)
	%	%	%	%
1847/53 to 1854/60 ...	2.9	0.8	2.1	2.1 (a)
1854/60 to 1861/65 ...	3.5	1.0	2.5	2.5
1861/65 to 1866/74 ...	2.7	1.5	1.2	1.0
1866/74 to 1875/83 ...	2.0	1.2	0.8	0.9
1875/83 to 1884/89 ...	1.6	1.2	0.4	0.7
1884/89 to 1890/99 ...	2.0	1.4	0.6	0.3
1890/99 to 1900/07 ...	1.8	1.5	0.3	0.3
1900/07 to 1908/13 ...	1.4	1.5	-0.1	0.0

(a) Uncorrected.

(¹) The index was constructed in the manner described for the index excluding cotton.

(²) My estimate of the number of coal miners for 1851 was 219,000. Apart from this the employment rates, as previously, are based on the estimates of Phelps Brown and Handfield-Jones subject to adjustment of the 1871/81 rate for retired persons as described in text.

¹ *Report of the Royal Commission on the Coal Industry* (1925), p. 128.

² Hoffmann's index includes other types of mining but their combined weight is insufficient to affect the trend significantly.

The removal of coal-mining does not seem to require any serious alteration to the conclusion previously reached. For the periods after 1875/83 the growth rate of productivity is a little higher but not enough to disturb the contrast of relatively high and low rates of growth on either side of a period roughly defined as the 1870's.¹

It would be interesting to know whether the relatively high rate of growth of productivity of the 50's and 60's is maintained as we move back to earlier periods. Unfortunately, limitations of coverage of the Census of Population before 1851 make it impossible to test this question but a positive answer seems plausible for two reasons. Firstly, the average growth rate of production from 1819/25 to 1847/53 is equal to that of 1847/53 to 1854/60 so that high rates of growth of productivity are possible even if the period before 1850 saw employment growing at a considerably more rapid rate than it did thereafter. Secondly, the substantial fall in the Net Barter Terms of Trade between 1819/25 and 1847/53 in the face of a rapidly increasing rate of growth of exports ² is consistent with the idea of a rapid increase in productivity especially since textiles, the most important section of exports were innovating during this period and there is evidence of considerable reductions in real cost of production.³

III.

Before discussing the possible causes of the climacteric of the 1870's it will be necessary to consider the conflicting

¹It should be noticed that the employment figures include all persons aged 10 and over (and in some cases, *e.g.* 1851-81 of less than 10) and it might be considered that the steady proportionate reduction in employment of young persons which occurred during the whole period could distort the employment growth rate and explain the relative decline in the growth of productivity. To allow for the changing composition of the labour force from 1851 onwards would be an enormous task even if adequate data were available. As a rough check I have recalculated the labour force for three strategic dates, 1851, 1871 and 1911, excluding completely all young persons below the age of 15. The effect of this adjustment is, naturally, to raise the employment growth rates for both periods but the difference between the rates as a result of the adjustment is only 0.1% which is quite inadequate to explain the difference in the rates of growth of productivity.

²*Cf.* Lewis, *op. cit.*, pp. 75, 143.

³*Cf.* Clapham, *An Economic History of Modern Britain*, Vol. I, pp. 143, 192-3 and 442-3. Also the data on wage costs quoted by Colin Clark, *Conditions of Economic Progress*, p. 310.

testimony of the series for real income a head as calculated by Professor Phelps Brown and Mr. Handfield-Jones. There are two aspects to be dealt with ; the high rate of growth of this series from 1875 to 1900 as compared with the series for industrial productivity and the abrupt fall in the growth of real income a head after 1900.

Prima facie the high rate of growth of real income a head before 1900 seems wrong if the Hoffmann index of production is not grossly inaccurate. We are accustomed to the idea that the growth of productivity in industry accounts for the major part of the progress in real income a head and, since industry is only a fraction of total activity, the discrepancy between the rates of growth should be the reverse of what it is ; a growth of some 0.5% or less per annum in industrial productivity cannot explain a growth of some 1.5% to 2% per annum in real income a head.

If it could be shown that this period saw an exceptional rate of growth of productivity in non-industrial sectors it might be possible to accept the reading of the series for real income a head. There is, however, no evidence to support such an argument at present.

As Professor Phelps Brown points out, there was growth in agricultural productivity during the period ; but the rate of growth of E. M. Ojala's series for net output a head (U.K.), which he reproduces, shows only a value of 0.6% per annum for the period 1867/9 to 1904/10.

The building industry might well display a presence or absence of growth in productivity. An attempt was made to get a rough measure by using Census data for operatives (G.B. and the revised series for residential construction of Professor Cairncross.¹ The results, though adjusted for the unemployment rate in the "building trade" (*i.e.*, joiners and carpenters) show so clearly the influence of the building cycle that no confidence can be placed in them.²

¹*Studies in Home and Foreign Investment, 1870-1913*, p. 157. Volume index.

²The intercyclal growth rates are : 1870-74 to 1879-83, -0.1% ; 1875-83 to 1884-89, -2.6% ; 1884-89 to 1890-99, +2.4% ; 1890-99 to 1900-07, +1.4% ; 1900-07 to 1908-13, -5.1%.

No adequate measure exists of output of the service industries for the period 1870-1913. Professor Phelps Brown and Mr. Handfield-Jones give series for rail traffic per operative and ocean transport but neither of these is satisfactory. The first is necessarily constructed without reference to the length of journey involved and in any case behaves in exactly the opposite way from that required for a climacteric of the 1890's. The second series is an index of the real cost of ocean transport relative to all other industries and suffers from the inclusion of the price index of final products which will be criticised presently.

Nothing can be said at this stage regarding productivity in other service industries, finance, distribution and domestic service but we should not expect them to be significantly affected by innovations in steam and steel in the period under review.

If the pattern of trend of the series for real income a head is not to be explained by changes in productivity an alternative explanation is required. It is suggested that the main cause of the break in trend after 1900 will be found in the statistical basis of the price index used to deflate the series.

It should be noted first that no adjustment was made to the series in question in respect of secular changes in the level of unemployment so that movements of productivity and production are mixed together. Since it is known that secular fluctuations in aggregate activity occurred in the U.K. during the period in question¹ we should expect to find these present in an unadjusted index of real income a head. Thus we should expect to find some decline in trend after 1900 in consequence of the transition from the upswing to the downswing of the building cycle. We should also expect the series to show a relatively low rate of growth in the 1880's, in consequence of the building slump of the 1880's.² The decline in trend after 1900 is evident in the real income series, though it seems more abrupt than we might expect ; but the trough of the 1880's is entirely lacking. If it could be shown that the measure of real

¹Cf. W. A. Lewis and P. J. O'Leary, *Secular Swings in Production and Trade, 1870-1913*, *Manchester School*, May, 1955, pp. 113-152 and the sources listed there.

²Cf. The diagrams in Lewis and O'Leary, *op. cit.*, pp. 119, 123.

income a head as constructed would necessarily exaggerate the rate of growth before 1900 and particularly in the 1880's it could be claimed that an explanation of the trend in the series had been given without needing to resort to abrupt changes in the growth of productivity. It is believed that the errors mentioned follow naturally as a result of the price index number used by Professor Phelps Brown and Mr. Handfield-Jones to deflate the estimate of national income a head.

Their method is to build up a composite price index of the prices of final products. Its components are as follows.

- (1) Cost of Living (Bowley's estimate)—weight 60%,
- (2) Wage rates—weight 10%,
- (3) Manufactured consumer goods—weight 20%,
- (4) Capital goods—weight 10%.¹

The weights are determined by reference to the ratios of expenditure (in the various groups) to the national income. But what is relevant for a price index of final products is outputs not expenditures. The resulting price index is a measure of the buying power of national income on a broader basis than is normally considered (though in fact the trend is barely different from that of the cost of living number). It may be very misleading if used to produce a series for national output, for two reasons. First, it makes no adequate allowance for the prices of services of all kinds which form a considerable part of national output.² Secondly, a considerable amount of final expenditure goes on imported goods which are paid for by exports of manufactures and services, which are the real components of national output. What is needed is an index which gives a much greater weight to the prices of manufactures and services and a smaller weight to the Cost of Living component. The danger of using the above index to measure national output may be seen by examining the first component. In the Bowley Cost of Living index number food carries a weight of 60%. Therefore 36% of the total weight of the Phelps Brown index of prices of final products is accounted for by food. It is

¹See *Oxford Economic Papers*, *op. cit.*, p. 293 for details.

²For the period 1870-1913 some 35-55% of national output may have been accounted for by services. See Colin Clark, *Conditions of Economic Progress*, p. 443.

obvious that the output of food bore no such relationship to national output. Over the period 1871 to 1911 the proportion of the occupied population engaged in Agriculture and Fishing declined from about 14% to 8% in England and Wales and Great Britain.¹ In Ireland the proportion was higher, some 41%-45%.² For the United Kingdom this would mean about 15% on average for the period 1870-1913. It appears also to be a fact that income a head generated in agriculture is less than the national average.³

Unfortunately, this does not exhaust the objections to the price index of final products. For the period before 1880 Bowley's index was not constructed from consumers' prices but was estimated from an empirical formula as follows,

$$C = 33.4 + 0.32 F + 0.34 M,$$

where F and M are Sauerbeck's index numbers of food and raw materials, the parameters being estimated from data for the period 1880-1914.⁴ The Sauerbeck index numbers account for a further 13% of the weight of the price index of final products, under the heading of manufactured consumer goods and capital goods.⁵

The effective structure of the price index of final products is therefore as follows.

	1870-79	1880-1900	1901-1913
	%	%	%
Food prices	73	36	36
Raw material prices ..		15	23
Export prices	14	14	14
Wage rates	10	10	10
Other prices	3	25	17

¹Colin Clark, *Conditions of Economic Progress* (2nd edition, London, Macmillan, 1951), p. 408; E. A. G. Robinson, "The Changing Structure of the British Economy," *Economic Journal*, September, 1954, p. 459.

²Clark, *op. cit.*, p. 409.

³Cf. Clark, *op. cit.*, pp. 443, 454-57. Relative income a head in agriculture is given as 108% in 1868 and 85% in 1911. The 1868 figure may be unduly high (*op. cit.*, p. 444).

⁴Note that even after 1880 the "miscellaneous" and after 1900 also the "clothing" components of Bowley's index are based on Sauerbeck series.

⁵Phelps Brown and Handfield-Jones, *op. cit.*, pp. 293, 304. A further 14% under the same headings being accounted for by the volatile prices of finished export goods (*ibid*).

Thus, the price index at its best, is half composed of prices of food and raw materials and for more than half the period their influence is greater.

To some extent this bias in the index is met by the adjustment made to home-produced income for changes in the Terms of Trade ; but it is doubtful if the adjustment is adequate to convert a real income series into a real output series. A tolerable series for real output could be got by summing consumption, investment, government expenditure on goods and services and exports and deducting imports, each item being deflated by its own price index number. If such a method is to be approximated by deflating a current income series the composite price index number should include suitably weighted indices of the prices of imports and exports of goods and services.¹ Ideally these weights should be changed annually if the proportions of imports and exports are not constant. The method used by Professor Phelps Brown and Mr. Handfield-Jones is to allow for foreign trade by deducting from current income, before deflation, an amount equal to current imports multiplied by (the reciprocal of the Terms of Trade minus 1) ². This method fails to allow for changes in the weights of imports and exports since the adjustment is zero as long as the Terms of Trade do not change. Also it does not take into account the prices of invisibles. These are relatively minor points. A more important criticism is that with over 50% of the general price index consisting of prices of foods and raw materials the Terms of Trade adjustment of the bias caused by import prices can only be at most 50% effective if we assume that imports represent about 25% of national income. The effectiveness of the adjustment may be further weakened by the presence in the index of 14% of export prices. Since export prices have been allowed for in the Terms of Trade adjustment their inclusion again in the composite price index number is warranted only if they are valid indicators of the prices of home consumed manufactures and services, which seems a doubtful assumption.

¹This is the method used by Colin Clark, *National Income and Outlay*, p. 196. The price of imports should have a negative weight. The disadvantage of this method, as compared with the method of summing deflated components, are discussed on pp. 198-9.

²*Oxford Economic Papers*, p. 293.

In fact, for most of the period under review the trend of export prices follows closely the trend of raw material prices, doubtless owing to the importance in exports of textiles. From 1870/74 to 1884/89 the average annual rate of decline of export prices was 2.6% compared with 2.9% for the Sauerbeck raw materials index. From 1890/99 to 1908/13 the average annual rates of increase were almost the same at about 1.5%.

This dependance of the index number of prices of final products on the prices of primary products and exports is unfortunate since the period from the 1870's to the 1890's was one of extremely rapid decline in such prices. The growth rates of the Sauerbeck and Bowley series together with series for wage rates, the Terms of Trade and the Phelps Brown index of prices of final products are presented below.

INTERCYCLICAL AVERAGE ANNUAL GROWTH RATES

	(¹) Sauer- beck (Food)	(²) Sauer- beck (R.M.)	(³) Bowley (Food)	(⁴) U.K. Terms of Trade	(⁵) Wage Rates	(⁶) Prices of Final Products
	%	%	%	%	%	%
1870/74 to 1879/83 ...	-1.2	-3.1	(a)	-1.4	+0.7	-1.5
1875/83 to 1884/89 ...	-3.2	-2.5	(a)	+0.2	-0.2	-2.0
1884/89 to 1890/99 ...	-0.9	-1.0	-0.8	+1.2	+0.8	-0.4
1890/99 to 1900/07 ...	0	+2.0	+0.5	+0.7	+0.7	+0.9
1900/07 to 1908/13 ...	+1.4	+1.0	+1.1	-0.3	+0.3	+0.9

(a) Series begins 1880.

(¹, ²) From Layton and Crowther, *An Introduction to the Study of Prices*, pp. 238-9.

(³) A. L. Bowley, *Wages and Income in the U.K. since 1860*, p. 121.

(⁴) From W. Schlote, *British Overseas Trade from 1700 to the 1930's*, translated by W. O. Henderson and W. H. Chaloner, pp. 176-177. The series by A. Imlah, *Journal of Economic History*, 1950, pp. 180-2, gives approximately the same growth rates.

(⁵) Phelps Brown and S. V. Hopkins, "The Course of Wage Rates in Five Countries," *Oxford Economic Papers*, 1950, p. 276.

(⁶) Phelps Brown and Handfield-Jones, *Oxford Economic Papers*, 1952, pp. 294-5.

The rapid fall in primary product prices in the first two periods stands out, and must account for the major part of the decline in the price index of final products. For the period ending 1884/89 the decline in food prices alone can explain over 1% of the decline of the general price index. Practically no adjustment for the Terms of Trade is called for in this second period.

After 1900 the combined influence of food, raw materials and export prices will give an upward bias to the general price index number, unless, as seems unlikely, the prices of home consumed manufactures and services were rising even faster.

The trend of wage rates contrasts strongly with that of primary product prices between 1870 and 1900 and rises more slowly after 1900. If wage rates are accepted as an indicator of the prices of services and given a greater and increasing weight¹ this would operate to moderate both the decline in prices before the 1890's and the rise thereafter.

In the light of the above criticism it seems necessary to conclude that the price index of final products may be very misleading and, bearing in mind the admitted provisional nature of the series for current incomes,² there does not seem to be any need to postulate a climacteric in productivity in the 1890's. The break in trend can be explained by the turning point of a price series which over-estimates both the decline in prices before the 1890's and the rise thereafter. It should be mentioned that on page 273 of their article the dangers of their price index were recognised by the authors; but they failed to see that this led logically to the rejection of the climacteric of the 1890's.

There was undoubtedly a genuine change in the trend of real purchasing power per head of the occupied population around 1900, but the explanation for this is to be found in the international factors which determine the Terms of Trade between manufactures and primary products.³

¹In England and Wales the percentage occupied in service industries increased from 39% in 1871 to 46% in 1911. See Robinson, *op. cit.*, p. 459.

²See A. R. Prest, "National Income of the United Kingdom, 1870-1946," *Economic Journal*, 1948, p. 31.

³See W. A. Lewis, "World Production, Prices and Trade, 1870-1960," *Manchester School*, May, 1952.

IV.

The causes of the climacteric of the 1870's will be discussed briefly since any explanation of this phenomenon must, for lack of adequate data, necessarily be of a tentative nature. Professor Phelps Brown and Mr. Handfield-Jones dating the climacteric in the 1890's find its causes to lie in

. . . the declining rate of extension at this time of the techniques of power, transport, and machinery comprised beneath the names of Steam and Steel . . .

. . . our main explanation of the check to the rise of real income in the United Kingdom about the end of the nineteenth century is that the previous rise had been carried forward by the massive application of Steam and Steel, which now had not much scope for extension . . . ¹

Explanations in terms of declining efficiency of management and labour are rejected. The well-known complaints of reduced efficiency of management and labour during the last quarter of the 19th century are conceded but are not regarded as the "active cause" of the check to productivity.² Capital accumulation is examined but is found to continue its trend without check and even with acceleration after 1900 and therefore the check cannot be explained in terms of a reduced rate of application of labour-saving equipment.³

The explanation given above is inappropriate for two reasons. First, if the climacteric is dated in the 1870's, the event can hardly depend on the ending of the massive application of steel since this presumably requires the massive availability of steel, a condition hardly fulfilled in the 1870's. During this decade the average annual steel production was not much above $\frac{1}{2}$ million tons. It is true that steel production grew considerably in the following twenty years but this period coincides with a decline in the rate of growth of productivity to levels well below those of the twenty years before 1870. If it is true that the massive application of steel was ending in the 1890's this does not seem to have produced any significant

¹*Op. cit.*, pp. 282-3.

²*Op. cit.*, pp. 279 ff.

³*Op. cit.*, p. 285.

decline in the growth of productivity. Secondly, the explanation given seems to be contradicted by the behaviour of their index of capital a head which shows continued growth throughout the period. It is difficult to see why the pace of capital accumulation should continue unchecked when a period of massive innovation had ceased. We should expect at least some rough association between innovation and accumulation. The perverse behaviour of the capital series is explained away by Professor Phelps Brown and his colleague by postulating the end of the "innovation effect."¹ But this would surely have implied a severe fall in the marginal productivity of investment after 1900 and it is difficult to see why capital accumulation should continue along its trend in the face of such a change. By dating the climacteric in the 1870's this difficulty is removed. Bearing in mind the differences in coverage and the fact that the capital index is not adjusted to allow for changes in its utilisation there is no serious disagreement between the trend in capital a head and industrial productivity between 1870 and 1913.

It is easy to amend the hypothesis developed by Professor Phelps Brown to take account of the revised dating of the climacteric. Since the 1870's mark the transition from the Iron Age to the Steel Age let us suggest that the climacteric marks the end of the general application of steam power and iron machinery to the staple industries of Britain. This change was probably accompanied by a decline in the rate of capital growth per head in industry, since the ending of these profitable innovations would reduce the incentive to accumulate capital. The hypothesis does not require that the transition from iron to steel produced no increase in industrial productivity, only that the effects of steel were less powerful than those of iron. The substitution of steel machinery for iron would doubtless improve its precision and enable an increase in its speed of working; but the yield would probably be less significant than that from the original substitution of iron machinery for handwork. The hypothesis need not exclude an occasional case where the iron stage was omitted, as *e.g.*, in corn-milling.²

¹*Op. cit.*, p. 286.

²See Clapham, *op. cit.*, Vol. II, pp. 88-9.

Nor need it exclude the use of steel (not necessarily mass-produced) in small quantities in key parts of iron machinery. In the case of at least one industry, that of coal-mining the climacteric may be explained by the ending of the application of steam and iron and the failure to apply steel effectively. The coal-mining industry exhibits the climacteric in a dramatic way. After rising from 1847/53 to 1866/74 at an average annual rate of about 2% the growth of productivity ceases to rise between 1866/74 and 1875/83 and thereafter declines at a rate approaching 1% per annum. The period of rapid growth can be explained by the application of steam power and iron to the tasks of winding, ventilation and underground haulage. Apart from improvements in these fields the obvious application of steel was to the problem of mechanical cutting ; but though mechanical cutters were developed as early as the 1860's, by 1901 only 1½% of total output was cut by machinery.¹ The Royal Commission of 1925 noted that in America at the beginning of the 20th Century some 25% of coal was mechanically cut. Of course, coal-mining is an industry subject to diminishing returns but need these have been encountered so dramatically? Whether or not mechanical cutting was economic in the 1880's and 1890's it seems possible to explain the decline in productivity objectively in terms of the ending of application of iron and the failure to apply steel.

This hypothesis of the ending of the massive application of steam and iron is plausible enough but there are two reasons for not being content with it. Firstly, it is rather a vague hypothesis and, as formulated, might prove difficult to verify. Secondly, the theory does not seem adequately to explain the relative stagnation of Britain as compared with the U.S.A. and Germany after 1870. In the U.S.A. the trend rate of growth of productivity in manufacturing industry was 1.6% per annum between 1873/83 and 1908/13.² For Germany the data is less reliable, but the trend of productivity may have

¹*Report of The Royal Commission on the Coal Industry* (1925), p. 122.

²Based on series 6 in B. Weber and S. J. Handfield-Jones, "The Rate of Economic Growth in the U.S.A., 1869-1939," *Oxford Economic Papers*, June, 1954, p. 127.

been as high as 2.6% per annum.¹ If such rates of growth were possible in the Steel Age why was the British rate of growth so low? The contrast may be explained by the later start of a period of rapid industrialisation in the U.S.A. and Germany and their adaptation of steel machinery at the outset ; but this can hardly explain everything. Though the rate of growth of manufacturing production in the U.S.A. and Germany, between 1870 and 1913 was more than double that of the U.K.,² they were not negligible producers at the beginning of the period. In 1870 Britain accounted for 32% of world manufacturing production. The shares of the U.S.A. and Germany were 23% and 13% respectively.³ The rapid growth of productivity in these countries could, therefore, equally plausibly be explained in terms of a more active replacement of obsolete machinery and a more rapid accumulation of newer types. Perhaps the potential innovations of the Steel Age were not as fully exploited by the U.K. as by Germany and the U.S.A.

Without rejecting the modified theory of Professor Phelps Brown, but rather to formulate it in more concrete terms, it is suggested that the decline in productivity in the U.K. after the 1870's, and its low level as compared with the U.S.A. and Germany is to be explained by a relatively low rate of growth of capital per head in industry after the 1870's. The fragmentary evidence available at present lends some support to this hypothesis. Using Professor Douglas's estimates, by decades, for the growth of capital in the U.K., and ⁴ excluding farmers' capital and railway capital before deflating, the average annual rate of growth of industrial capital between 1875 and 1914 is about 2.3%, or less than 1% per head of the occupied

¹Professor Lewis gives the trend of production as 4.7% (*Manchester School*, May, 1955, p. 149). The trend in employment is based on Census data given by G. Stolper, *The German Economy, 1870-1940*, (Allen and Unwin, 1940), p. 41.

²See Lewis, *Economic Survey*, p. 74.

³League of Nations, *Industrialisation and Foreign Trade*, p. 13.

⁴P. H. Douglas, "An Estimate of the Growth of Capital in the U.K., 1865-1909," *Journal of Economic and Business History*, 1930.

population in the Hoffmann industries.¹ The revised estimates by Professor Phelps Brown and Mr. Handfield-Jones² give the same rate of growth when deflated by the Douglas price index number. If their price index number for capital goods is used the growth rate is raised by 0.4% ; but this index, like their price index of final products is too much dependent on raw material and export prices. If the elasticity of output with respect to capital is of the order 0.25 to 0.5 it³ is not surprising that the rate of growth of industrial productivity between 1875 and 1913 should be of the order 0.5% per annum or less.⁴ An interesting feature of the Douglas capital estimates is that, for the decade 1865/75, they show an increase which is twice as great as that for any subsequent decade. It is curious that the trend of this admittedly approximate index of capital growth should display the same suggestion of a decline in growth after the 1870's as is found in the independent measures of production and productivity. Additional support for the argument of low capital growth may be found in data in power available per operative in manufacturing industry towards the end of the period. In 1907, horse-power available per operative in manufacturing industry in the U.K. averaged about 1.4.⁵

¹Professor Douglas's price index is the mean of Sauerbeck's index of raw material prices and an index of wage rates. Deflating by the price index proposed by J. H. Lenfant, "Investment in the United Kingdom, 1865-1914," *Economica*, 1951, does not alter the growth rate.

²*Oxford Economic Papers*, p. 306.

³*Cf.* Colin Clark, *Conditions of Economic Progress*, p. 518.

⁴It will be noticed that this implies a rising capital-output ratio which seems to conflict with popular beliefs that such ratios are constant. But these ratios are usually given for aggregate capital and income. It does not follow that all components of capital must grow at the same rate ; for some periods of industrial evolution capital in houses and, *e.g.* railroads may grow at a lower rate than industrial capital. In money terms the capital-output ratio for the U.K. rose from 3.2 in 1875 to 3.9 in 1914 (using the values given by Phelps Brown, *Oxford Economic Papers*, p. 306, and Prest's figure for national income, less dividends and interest from abroad). Comparisons in real terms are not possible until adequate estimates of real output are available. The figures quoted by Phelps Brown and Weber, *Economic Journal*, 1953, p. 266, seem to depend on their estimates of real income, which I have argued above are misleading.

⁵For convenience the figure given by Rostas is used, which seems to include an estimate of power used in the form of purchased electricity. This information was not collected in the Census but the amount involved was almost certainly small. See Rostas : *Comparative Productivity in British and American Industry*, p. 68.

In the U.S.A. the roughly comparable figure for 1909 was 2.9.¹ The objections to the use of measures of horse-power per head as indicators of capital equipment are well known² but the figures may give a rough indication of the relative amounts of capital available per worker. If American equipment was superior in quality the contrast is heightened. The figures quoted here do seem to lend support to the idea that, despite a later start, the rate of accumulation of capital per operative was faster than that of the U.K. and this may explain part of the difference in the rates of growth of productivity.

A rigorous test of the hypothesis proposed must await the accumulation of more accurate data on capital accumulation before and after the 1870's. The immediate problem is now to explain the postulated relatively low rate of capital growth per head in the U.K.

It seems clear that the low rate of accumulation cannot be explained by any deficiency of savings in view of the enormous export of capital during the period, which was of the order of £3,000 million between 1875 and 1914 or some 40% of total savings.³ Were these savings forced to migrate in search of higher yields than were available at home? It does not seem likely, since much of the capital export went into fixed interest securities, and the average yield may have been as low as 5%, compared with an average yield on real capital at home of some 11%.⁴ Of course, one could postulate various types of market imperfection which could reconcile this sort of yield discrepancy with superior expectations for given classes of investment, but the existence of savings on such a scale suggests that if the demand for savings at home had been greater the supply would have been forthcoming. The low rate of capital accumulation must therefore be explained by factors on the demand side.

Was the low demand for savings accounted for by the alleged decline in the efficiency of British entrepreneurs? It would be possible to argue that the transition from the relatively

¹*Ibid.*

²See Rostas, *op. cit.*, pp. 54-5.

³Cairncross, *Home and Foreign Investment, 1870-1913*, p. 4.

⁴Data on this subject is naturally scanty. The figures given are based on Cairncross, *op. cit.*, pp. 226-7 and 229-31 and Phelps Brown and B. Weber, *op. cit.*, p. 267.

crude technology of the Iron Age to the more advanced technology of the Steel Age could expose weaknesses in an entrepreneurial system, which did not place enough emphasis on technical and scientific education ; but the evidence for this is hardly conclusive.

It seems clear enough that in the iron and steel industry there was a decline in entrepreneurial talent after the 1870's. In 1880 production of steel in Britain, the U.S.A. and Germany was around the level of 1 million tons. By 1913 British output stood at about 8 million tons whilst Germany and America were producing 17 and 31 million tons respectively.¹ It has been argued that the failure to develop mass-produced steel as effectively as our competitors was accounted for by a relative inferiority in British entrepreneurship in connection with the problems of mass-production of iron and steel.² This was a weakness in a fundamental industry. Equally fundamental was coal-mining in which the failure to apply steel may have been due to entrepreneurial weakness. Other examples would be the loss of initiative to Germany and the U.S.A. in the development of chemicals and electrical engineering and its applications.³ It is not necessary, however, to lean heavily on this theory of entrepreneurial decline, since the low rate of capital accumulation in Britain can be explained by a more powerful factor arising from British dependence on international trade.

The decline in the growth of productivity after the 1870's is associated with a parallel decline in growth of production and exports. It seems evident that any discussion of the causes of the climacteric in productivity must have relevance to the

¹The necessary allowances must be made for distribution of resources. As Sir John Clapham puts it, in relation to the U.S.A., "Half a continent is likely in the course of time to mine more coal and make more steel than a small island." (*Op. cit.*, Vol. II, p. 122). Something of the same applies to the German development, behind tariff barriers of basic steel, which Englishmen had made possible. But the fact remains that iron and steel produced per capita grew more slowly in Britain than in the U.S.A. and Germany, and even than in Belgium and France. See Burnham and Hoskins, *Iron and Steel in Britain, 1870-1930*, pp. 52-3.

²See D. L. Burn, *The Economic History of Steelmaking*, especially Chap. 10 and pp. 67-9 and 296-305. Also Burnham and Hoskins, *op. cit.*, especially Chap. 9.

³*Cf.* Clapham, *op. cit.*, Vol. II, pp. 106, 108-9, Vol. III, pp. 124, 130-1, 136-7, 313.

causes of this generalised climacteric. The suggestion about to be made is that the decline in growth of British exports after the 1870's explains the low rate of industrial capital accumulation during this period and, as a result, explains the low rate of growth of productivity. The theory is based on the analysis of Professor Lewis who, in his *Economic Survey, 1919-1939*, suggested that the decline in production after 1870 and Britain's relative stagnation can be explained in terms of the declining trend in British exports.¹

Taking the average annual growth rates of Schlote's measure of total home produced exports, the value from 1819/25 to 1866/74 is 4.7% and for 1866/74 to 1908/13 2.3%. The corresponding growth rates for industrial production are 3.3% and 1.7% respectively. The rates for some of the principal industries are as follows :

PERCENTAGE AVERAGE ANNUAL GROWTH RATES (¹)

	1827/36 to 1866/74		1866/74 to 1908/13	
	Production	Exports	Production	Exports
Coal	4.0	8.3	2.1	4.4
Iron and Steel ...	5.4	4.8	2.4	2.3
Machinery	5.1	8.1	2.8	5.1
Cotton	3.9	4.3	1.5	1.7
Wool... ..	2.1	4.4	1.6	-0.2

(¹) Series based on Hoffman and Schlote, *op. cit.* Note that the production series for "machinery" is Hoffman's "Iron and Steel goods, machinery, tools, etc." which is really the Iron and Steel series plus net imports reweighted. The Cotton and Wool production series are combined yarn and cloth, which again are merely differently weighted measures of cotton and wool consumption subject to deductions for spinning losses and net exports of yarn. Schlote's volume estimates for individual exports do not extend beyond 1827.

If the growth rate of exports is regarded as an exogenous variable, the general decline in the growth of exports after the 1870's undoubtedly explains a decline in the rate of growth of production and in the required rate of investment. Given a reduction in the rate of investment a decline in the rate of growth of productivity will follow.

¹*Op. cit.*, p. 74.

Two possible objections to the hypothesis must be dealt with. First it seems to require the assumption that the rate of growth of exports was exogenous, which needs to be justified. Secondly, it would be possible to argue that a decline in the growth of exports can only explain a decline in production and does not necessarily require a decline in productivity. In other words, whilst a reduced rate of growth of exports can explain a check to capital widening, it need go no further than that.

The assumption that the growth of exports was exogenous can be defended to some extent. Even if Britain's share of world trade in manufactures had remained unchanged the volume of exports was bound to reflect the declining growth in volume of world trade in manufactures during the 1880's and 1890's which was caused by the adverse terms of trade for primary producers.¹ Superimposed on this basic trend was the effect of Britain's declining share of world trade in manufactures which was also partly exogenous, since it reflected the rapid industrial development of Western Europe and the U.S.A., the erection of tariff barriers and competition in international trade often accompanied by price discrimination. A rough idea of the effects of these factors on Britain's trade in manufactures can be gained by using Schlote's analysis of exports by volume to industrial and agrarian countries. The percentage increases in the volume of exported finished manufactures between selected dates are as follows :²

	1854/7 to 1877/9	1877/9 to 1908/13
Industrial Europe ..	122	47
U.S.A.	— 13	24
All agrarian countries ..	107	125

The figures illustrate the effects of the reversal of the free trade movement of the 1860's and 1870's on trade with Industrial

¹See Lewis, *Economic Survey*, p. 74 and "World Production, Prices and Trade, 1870-1960," *Manchester School*, 1952.

²Based on Schlote *op. cit.*, Tables 32 and 34. The estimates are got by the crude method of applying the percentage of trade in manufactures from Table 34 to the volume of exports of home produced goods in Table 32. The dates fall in different stages of the trade cycle, but a comparison of the trend in the aggregates with the inter-cyclical growth rates suggests that the figures are reasonably good indicators of the trends.

Europe. In the case of the U.S.A. the big increase in tariffs dates from the 1860's. The combined total of exports to Industrial Europe and the U.S.A. was not insignificant, being about 50% of the trade with agrarian countries in 1877/79.¹

It seems reasonable, therefore, to regard some part, and perhaps a substantial part, of the climacteric in production as being caused exogenously by the effects of world factors on British export growth. But this cannot be the complete explanation since the share of British exports in world trade will depend on the type of goods which Britain produces and their relative prices as compared with foreign exports. These things in turn depend on the reaction to technological progress and the trend in productivity. Here we encounter the second objection. Can the decline in growth of exports explain the decline in growth of productivity or does the chain of causation work the other way? Do we need an independent explanation of the decline in productivity?

The answer is that, whilst an independent explanation need not be ruled out of an eclectic theory, a decline in productivity growth is bound to result from the check to investment caused by the check to exports. The reason is connected with the continuity of technological progress. A secular rise in demand for a product will require a secular growth in the capital equipment of producers. But, given the decision to add to capital, the efficient producer will take advantage of advances in technique with the result that reductions in real cost or improvements in quality will follow automatically. It follows that a decline in the rate of growth of exports can explain a decline in the rate of capital improvement and deepening and consequently a decline in the growth of productivity.²

If it is true that the period of the 1870's marks an end of the large scale and profitable application of the techniques of steam-power and iron machinery the explanation given above

¹*Cf.* Schlote, Table 34.

²It has, of course, been argued that a decline in demand ought to increase the incentive to instal cost-reducing equipment. Whilst cases of this may happen it cannot be general or the phenomenon of the business cycle would not exist.

is reinforced. Exports react on productivity and productivity reacts on exports to explain a generalised climacteric of the 1870's.

The implications, for this theory, of the export of capital should be noted. To the extent that this raised the demand for British exports it raised the demand for capital at home ; thus the relatively high capital export of the 1880's may have moderated the climacteric in exports and production. Also the rising rate of growth of British exports in the later part of the period, under the influence of improving terms of trade for primary producers and the surge of capital exports does not seem to have produced any effect on the growth of production. To some extent this is explained by the opposite trend in the building cycle ; the theory presented above depends on the low average level of the growth of exports after the 1870's as compared with the period before. But the relative inefficiency of British entrepreneurship may have been more important in the later years of the period after 1870.

The larger question, whether it would have paid Britain to concentrate more on investment at home in the period after 1870, *e.g.*, by resorting to protection, has not been discussed since it involves the analysis of a hypothetical world. But from the unemployment data of the period it seems reasonable to argue that Britain could have had more investment of both kinds had the incentive or enterprise been present. In this case the rate of growth of production and productivity would have been higher and this in turn would have made more investment possible.

D. J. COPPOCK.

University of Manchester.

Some Aspects of Building Society Finance

I.

In 1895 there were 3,642 societies registered with a total membership of 631,355 whereas in 1954 the number of societies had declined to 777 but the total membership had increased to 2,802,285.¹ During the same period the aggregate amount advanced on mortgage by societies had risen from £43,179,571 to £1,573,907,165.

These facts pose certain questions. Firstly, has the movement developed evenly or otherwise over the years since 1895, especially against the background of strongly fluctuating house prices in post-war years, and what has caused the growth? Secondly, the rise in the demand for loans by way of mortgage led to corresponding increases in funds being required by the movement; how have these funds been obtained? Thirdly, whilst total mortgage business has increased there has been a substantial decline in the number of societies. What has caused this decline? How has the total business been distributed, and why?

II.

The easiest way of dealing with the first question postulated is to graph on a semi-logarithmic scale statistics of the advances made year by year. (See Chart I). From the graph it will be observed that the rapid expansion of building society finance did not begin until after the first world war. The average amount advanced in the first decade was about £9 million compared with £298 million advanced in 1953.

The graph also shows that the rate of growth since the second world war has not been as great as the rate of growth in the 1920's and 1930's.² Indeed, when account is taken of price changes, the real volume of building society lending since the second world war has been only at about the level of 1939, and below the level of 1938.

¹Report of the Chief Registrar of Friendly Societies, 1954.

²The apparent slowing down in the 'thirties was mainly due to the decline of house prices.

CHART I

HOUSES COMPLETED BY PRIVATE ENTERPRISE IN THOUSANDS

140
120
100
80
60
40



TABLE I.
BUILDING SOCIETY ADVANCES,¹ £m.

Year	Amount Advanced	Deflator (Year End)	Adjusted Advance
1939	94	100	94
1946	188	228	82
1947	242	275	88
1948	264	269	98
1949	276	305	90
1950	270	311	87
1951	268	338	79
1952	266	321	83
1953	299	316	95
1954	373	312	120

Before the first world war houses were built by entrepreneurs for investment. The £9 million a year advanced by building societies in the fifteen years before the war cannot have financed more than about 20,000 transactions a year. The rapid growth of advances after the war was associated with the decline of private building for renting, which in turn was due to the operations of the Rent Restriction Acts. This association can be seen in Chart I where the number of houses built in each year is plotted with the amount of money advanced in each year. The curves diverge from year to year, but they grow over the period at the same average rate. The number of transactions in 1938 was 232,000, and the number of houses built by private enterprise in the same year was 253,000.

Since the second world war there has not been the same association between the number of transactions (307,000 in 1953) and the number of houses built by private enterprise

¹The index of house prices has been supplied through the kindness of the Co-operative Permanent Building Society. It is the index for houses costing from £1,501 to £2,500. It can only be an approximate guide as the Building Society data covers advances made on a large range of house values.

(62,121 in 1953). This may be due to owner-occupiers having to rely to a greater extent on purchasing old houses, due to the restrictions on building new houses.

The limits to the expansion of building society finance are set by two different factors (*a*) by competition between building societies and other sources for housing finance, and (*b*) by the growth of owner-occupation relatively to renting.

It would seem that there is scope for more competition with banks and insurance companies. There are no statistics showing the proportions of business done by the various lending institutions in the United Kingdom. It has been estimated that building societies assisted the purchase of about two-thirds of all houses privately erected during 1954.¹ Whereas the position in the United States is very different as shown by Table II.

TABLE II.
U.S.A. NON-FARM MORTGAGES OF \$20,000 AND UNDER ²

Type of Lender	1953 Millions of Dollars	% of Total
Savings and Loan Associations...	7,365	37
Insurance Companies	1,480	8
Banks and Trust Companies ...	3,680	19
Mutual Savings Banks	1,327	7
Individuals	2,840	14
Others	3,055	15
	19,747	100

Source :—Home Loan Bank Board.

On the other hand the scope for growth of owner-occupation is much greater in the United Kingdom than in the United States. In Table III below, 53·4 per cent. of American homes were owner-occupied in 1950.

In 1949 the proportion of British owner-occupied homes was 35%.³

¹Report of Registrar of Friendly Societies. Part 5. 1954.

²The Building Societies Gazette, March, 1955. Report on Housing in the U.S.A.—II. G. E. Rogerson.

³See Sir Harold Bellman, "Bricks and Mortals," page 159.

TABLE III.
U.S. HOUSING TRENDS ¹

Year	Non-Farm Homes (000's)	Owner-Occupied Homes (000's)	Owned %
1890	7,923	2,924	36·9
1910	14,132	5,245	38·4
1930	23,300	10,503	46·0
1950	37,105	19,666	53·4
1953	40,000	22,800	57·0

Source : U.S. Department of Commerce, Bureau of the Census.

We are therefore probably justified in concluding that the movement has still a demand to meet for financing future owner-occupation and that further growth of Building Societies will depend on their ability to attract funds from the investing public.

III.

We are thus brought to the second question. From whom have the funds been obtained which have financed a rising balance of mortgages culminating in 1954 at a figure of over 1,573 million pounds sterling? Why have these investors found this outlet so increasingly attractive?

If we examine the report of the Registrar of Building Societies for 1954 we find that funds for the movement are obtained from the following sources :

TABLE IV.
U.K. BUILDING SOCIETY FINANCE

	£000's
Investors in Building Society Shares	1,535,908
Investors in Building Society Deposit Accounts ...	221,403
Bank Loans	1,616
Building Societies' Reserves	90,119

We can ignore the bank loans as this supply of bank cash is being used by the movement in a rapidly diminishing manner.

¹Taken from the Building Societies *Gazette*, February, 1955. Report on Housing in the U.S.A.—G. E. Rogerson.

Since 1949 bank loans outstanding have declined by over half-a-million pounds per annum (from £5.3 to £1.6 million).

With regard to the remaining sources it is clear that the share subscription is the main source of finance.

Personal savings through institutional channels have been already investigated by various research organisations. It would seem that there are good grounds for believing that building societies are mainly a savings media of the middle classes.¹ If this is a fact the question deserves to be raised why is the building society more attractive than the Trustee Savings Bank? ²

It may be taken for granted that money seeking investment will be attracted by the highest yield, coupled with liquidity and safety. The building society movement can supply this investment through its shares and deposits. With gross yields of between £3.16.2% on deposit and £4.15.3% on shares,³ compared with 2½% gross Trustee Savings Banks or 3% Defence Bonds, the movement has attracted a growing source of funds for many years.

Why can a building society give such relatively higher yields? The answer is two-fold. Firstly a society can adjust its income to changes in the rate of interest by increasing to all borrowers its mortgage rate of interest and can thus keep ahead but in step with banking institutions and government funds. Secondly, by an unusual taxation arrangement with the Board of Inland Revenue, which has existed for many years and now has statutory authority, the building society pays income tax on the income going to investors.

The interesting fact is that the rate of tax which the society pays is well below the standard rate of tax in force for any fiscal year. This is not a taxation concession to the movement. It is an arrangement to receive an averaged rate of tax from the movement. The taxation rate is fixed which would result if all investors' incomes were aggregated and all personal allowances granted hypothetically. In other words, it is a

¹See, for instance, "Personal Savings through Institutional Channels," by Esme Preston. *Bulletin of the Oxford Institute of Statistics*, September, 1951, page 297. Compare average saving deposit in Trustee Savings Banks with that in building societies.

²See again above.

³In 1952-53. For later years the yield will be less owing to reduction of the standard rate of Income Tax until in 1955 there was a general rise in interest rates.

composite rate. Investigating this matter further it is clear that some investors in building societies actually would pay tax at a higher rate than the composite rate fixed by arrangement with the revenue authorities and others at a lower rate or would not be liable to pay any tax at all. The last category are plainly not aware that other gilt-edged funds pay higher interest rates than building societies, if one ignores the tax arrangement.

To the man in the street the taxation arrangements are attractive and this fact must play a big part in his investment selection. The composite rate was 4/10d. in the £ for the year 1953/54. As the standard rate was 9/- this is further proof that many investors belong to the higher income tax groups.

So it can be seen that large scale advertising of attractive rates of interest with what amounts to deposit banking facilities in every town has kept the movement supplied with funds. It has become one of the principal forms of national saving.¹

Apart from investing subscription funds in mortgages the building society movement apparently considers that house mortgages are a suitable investment for some of its reserves.

Table V shows inflowing funds on capital account, capital refunded and current advances.

It is interesting to note that only in war years did inflowing payments on capital account exceed outflowing payments. The surplus of outflowing payments must have been financed from changes in other assets and liabilities, from disclosed profits, and from undisclosed depreciation or other reserves. In the 17 years from 1937 to 1954 the surplus amounted to over £200 million pounds. In addition other assets less other liabilities increased by £112 million, whereas the balance of profits and disclosed reserves retained increased only by £52 million. These figures are surprising and lead to the conclusion that the movement has much greater financial strength than would appear from an examination of the aggregate of its balance sheets.

IV.

The third question which is of interest in the Registrar's figures is the reason for the decline in numbers of societies and the distribution of business amongst societies.

¹See *Bulletin of the Oxford Institute of Statistics*, September, 1951, page 293.

TABLE V. (£ millions)

	1954	1953	1952	1951	1950	1949	1948	1947	1946
Shares subscribed	334	269	239	192	184	148	117	102	81
Deposits made... ..	64	50	45	49	47	47	45	45	36
Repayment including interest on Mortgages	263	227	213	216	206	198	194	180	147
TOTAL	661	546	497	457	437	393	356	327	264
Advances on Mortgage ...	373	299	266	268	270	276	264	242	188
Interest on repaid Mortgages	68	60	52	46	42	38	33	29	26
Withdrawals of shares ...	172	148	137	120	98	79	67	60	53
Withdrawals of deposits ...	48	49	59	50	47	41	36	32	30
TOTAL	661	556	514	484	457	434	400	363	297
DIFFERENCE in Totals ...	—	—10	—17	—27	—20	—41	—44	—36	—33

	1945	1944	1943	1942	1941	1940	1939	1938	1937
Shares subscribed	46	40	35	27	29	40	67	78	76
Deposits made... ..	25	22	20	18	17	22	36	46	42
Repayment including interest of Mortgages	113	95	89	81	76	83	108	119	117
TOTAL	184	157	144	126	122	145	211	243	235
Advances on Mortgage ...	98	53	28	16	10	21	94	137	137
Interest on repaid Mortgages..	27	27	28	30	31	33	33	32	30
Withdrawals of shares ...	40	34	35	38	48	66	75	65	56
Withdrawals of deposits ...	22	19	20	19	23	35	44	38	31
TOTAL	187	133	111	103	112	155	246	272	254
DIFFERENCE in Totals ...	—3	+24	+33	+23	+10	—10	—35	—29	—19

Since 1895, every year except 1930 has shown a reduction in the number of societies on the register. In 1930 the previous year's figure of 1,026 was maintained. At first the decline in numbers was greater because of the large number of terminating societies.¹ Gradually these were reduced until in 1954 only 35 out of 777 societies were of the terminating type. The principal factors causing the reduction apart from the automatic termination of a society appear to be the amalgamation and absorption of societies by others and dissolution of unsuccessful societies.

As the number of societies has declined and the volume of business increased, it is interesting to see whether concentration of business is taking place.

The Registrar's Reports of recent years do *not* supply the information from which correct conclusions can be made. Fortunately in the years 1920 and 1931 details of the business done by every building society were published. From this information Table VI has been constructed.

In 1920 the smallest societies, representing 84.2% of the number of societies did 15.8% of the business (advances on mortgage). In 1931 the same percentage by number did only 8.7% of the business. At the other end of the scale, the largest societies, representing 3.2% of the number of societies, did 59.3% of the business in 1920, and 72.5% in 1931. Details are shown in Table VI.

We can see from the Tables that concentration took place from 1920 to 1931. The final question to which we can address ourselves is why concentration has taken place. A building society depends, firstly on adequate funds, and secondly on demands for mortgages. Societies with only local supplies of funds and demands for mortgages may find it difficult to bring supply and demand into equilibrium. If, however, the society extends its influence by means of branches and agents then funds from a larger number of sources together with applications for mortgages can be obtained and considered. The largest Building Societies in fact operate many branches

¹Terminating societies are created merely for the completion of a particular investment project and dissolved thereafter.

TABLE VI
MORTGAGE ADVANCES, BY SIZE OF SOCIETY

Mortgage Advance Groups	1920		1931	
	Percentage No. of Societies	Percentage Amount Advanced	Percentage No. of Societies	Percentage Amount Advanced
£ 1 - 500 ...	9.3	.11	6.1	.02
500 - 1,000 ...	8.0	.24	5.9	.05
1,000 - 5,000 ...	36.3	3.59	27.4	.70
5,000 - 10,000 ...	18.1	5.09	15.4	1.11
10,000 - 20,000 ...	12.5	6.76	14.6	2.13
20,000 - 30,000 ...	4.0	3.73	6.6	1.61
30,000 - 40,000 ...	2.7	3.60	4.0	1.35
40,000 - 50,000 ...	1.1	1.96	4.0	1.77
50,000 - 100,000 ...	3.5	9.15	5.6	3.88
100,000 - 150,000 ...	1.3	6.42	3.0	3.66
150,000 - 200,000 ...	.6	4.23	1.2	2.13
200,000 - 250,000 ...	.7	6.27	1.0	2.26
250,000 - 450,000 ...	.8	10.16	2.0	6.86
450,000 - — ...	1.1	38.69	3.2	72.47
	100.0	100.00	100.0	100.00

and agencies throughout the country. Indeed it can be read from the history of the Halifax Building Society¹ that in the very early days of that society the directors decided on a policy of opening branches. Is there any connection between size, operational costs and the branch policy?

¹*A Hundred Years of the Halifax*, by O. R. Hobson.

V.

This point brings us to the discussion of some aspects of the operational costs of building societies. For some years the Registrar's Reports have contained interesting details of management expenses as shewn in Table VII.

TABLE VII.
RATIO OF MANAGEMENT EXPENSES

	To £100 of Mean Mortgage Balances				To £100 of Mean Total Assets			
	Group A	Group B	Group C	Group D	Group A	Group B	Group C	Group D
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1952 ...	15 1	11 8	14 5	14 6	12 9	10 3	13 2	12 5
1951 ...	15 4	12 5	14 6	14 9	12 10	10 9	13 3	12 6
1950 ...	15 10	12 8	14 9	15 2	13 1	10 9	13 4	12 9
1949 ...	16 9	13 4	15 7	16 0	13 7	11 0	13 10	13 2
1948 ...	17 5	15 5	16 2	16 10	13 6	12 2	13 11	13 3
1947 ...	18 1	15 4	16 3	17 4	13 4	11 6	13 7	13 0
1946 ...	18 4	14 5	15 8	17 2	12 9	10 5	12 8	12 3
1945 ...	14 11	12 2	14 10	14 4	10 1	8 10	12 0	10 0
1944 ...	13 4	11 0	13 7	12 11	9 4	8 4	11 4	9 4
1943 ...	12 4	10 2	12 9	11 10	9 2	8 3	11 1	9 3
1942 ...	11 4	9 9	12 2	11 1	9 2	8 4	11 1	9 3
1941 ...	10 9	8 11	11 8	10 5	9 2	8 0	10 11	9 2
1940 ...	9 10	8 11	11 10	9 11	8 9	8 2	11 3	8 11
1939 ...	11 11	9 10	12 2	11 5	10 8	9 1	11 8	10 5
1938 ...	12 11	10 6	12 10	12 4	11 4	9 8	12 3	11 1

Groups A, B, C and D relate, respectively, to the groupings employed in the General Summary, *i.e.* "Societies with assets exceeding £5,000,000 at end of year," "Societies with assets between £1,000,000 and £5,000,000 at end of year," "Other Societies" and "All Societies."

A striking feature of the Table is the consistency with which the ratios of the societies in Group B fall below those of the societies in the other groups. It is clear that Group B has consistently lower management expenses than any other of the groups. One might have expected the larger organisations to have shown more efficiency because of the possible large scale economies.

The problem is provocative and in an effort to ascertain the truth a large sample of all the financial accounts of active building societies in the year 1953 was analysed.

Management expenses were calculated as a percentage of Gross Profit and the results analysed in similar capital groups to those used by the Registrar. As was expected the results tallied with those of Table VII.

It was then discovered that if the analysis was re-classified with additional categories of those societies with branches and those without branches that the non-branch building society had on average the lesser cost ratio. Further that Group A contained *none* of the building societies which do not operate through branch offices. A further analysis was made of the 217 societies with gross incomes exceeding £4,000 in 1953. The result of this analysis showed conclusively that in each size group the societies with branches have proportionately greater management expenses than the societies without branches in Group B. A note, by my colleague, Mr. J. Johnston, on the statistical tests which proved this statement is given in the Appendix to this paper.

In the light of this conclusion one may ask why the societies with branches have expanded more than those with no branches. The answer has once more two parts :

Firstly, a simple analysis of one type of profit made on £100 mortgage would appear as follows :—

Gross profit at $4\frac{1}{2}\%$ per annum	..	..	£4 10 0
Less Management Expenses	..	..	12 0
			<hr/>
			£3 18 0

Share Dividend at $2\frac{1}{2}\%$ per annum				£2	10	0	
Tax added at							
5/1d. say,	..	..		17	0		£3 7 0
(To obtain taxable income charge)				..	..		11 0
Tax at 9/-	..	..	..	..	..		4 11
							6 1
Profits Tax 2% of £3 18 0				..	..		1 7
Building Society Net Profit, excluding							
depreciation and foreclosure losses				..	..		4 6

It naturally follows that societies which by advertising and branch organisations succeed in making larger turnovers at the cost of increasing management expenses will reap some net profit per £100 mortgage provided their management expenses do not exceed a certain margin.

The second part of the answer lies in the fact that a building society is an enterprise which unless making losses does not always come under eager scrutiny from the shareholders. Provided management is competent the shareholders' reward is constant. It only fluctuates when interest rates rise or fall. A big society rarely pays higher dividends than the medium or small society. Local needs, supported by shrewdness and social consciousness have invariably been the cause of the foundation of the building societies. Progress, in the sense of enlarging societies does not appeal to all boards of directors, so much as efficient management of local funds entrusted to them and the effective fulfilment of local needs.

*Department of Economics,
The University of Manchester.*

G. W. MURPHY.

Statistical Note

This analysis relates to the 217 Building Societies which had a gross income exceeding £4,000 in 1953. The societies were divided into six groups by value of Gross Income and the mean of the cost ratios was computed for each group. The results are shown in Table I.

TABLE I
MEAN COST RATIO FOR VARIOUS SIZES OF BUILDING SOCIETY. (1953).

Gross Income of Society	£4,000 & under £10,000	£10,000 & under £40,000	£40,000 & under £100,000	£100,000 & under £250,000	£250,000 & under £650,000	£650,000 & over
Number of Societies	30	45	53	42	23	24
Mean Cost Ratio %	15.2	12.8	12.0	11.7	12.0	12.5

There is, however, a considerable spread of the cost ratios *within* any given size group and so the question arises whether the variation between the mean cost ratios of Table I is significant in relation to the variation about the mean values within each size group. Performing an analysis of variance we obtain a variance ratio of 4.3, with degrees of freedom $n_1 = 5$ and $n_2 = 207$, a value which is significant at 1% level, and so we conclude that there is undoubted variation in the mean cost ratio for different sizes of Society.

It is then of interest to subdivide the 217 Societies into the two classes of Non-Branch and Branch Societies respectively, and to examine the behaviour of the mean cost ratios with increasing size in each class. Retaining the same six size groups as in Table I we obtain the mean cost ratios shown in Table II.

TABLE II
MEAN COST RATIOS IN NON-BRANCH AND BRANCH BUILDING SOCIETIES (1953)

Gross Income of Society		£4,000 & under £10,000	£10,000 & under £40,000	£40,000 & under £100,000	£100,000 & under £250,000	£250,000 & under £650,000	£650,000 & over
Non-Branch Societies	No. of Societies	27	41	44	30	3	4
	Mean Cost Ratio %	15.1	13.3	12.0	11.0	10.8	8.9
Branch Societies	No. of Societies	4	4	9	13	18	20
	Mean Cost Ratio %	16.5	14.5	12.8	13.1	12.9	13.2

The Non-Branch Societies are concentrated in the lower four size groups of the scale and the Branch Societies in the top four. Applying variance analysis to each class separately, the variance ratio for the Non-Branch Societies is 4.6, which is significant at 1% level, while that for the Branch Societies is approximately unity, which does not indicate a significant variation in the mean levels. Thus the U-shaped pattern of the mean cost ratios in Table I is the net resultant of two separate underlying patterns, namely (a) a cost ratio declining with size of Society in the Non-Branch Societies and (b) a more or less constant cost ratio in the four major size groups in the Branch Societies. It appears also that in comparable size groups the Non-Branch Societies have a slightly lower cost ratio than the Branch Societies.

An important assumption underlying the analysis of variance tests is that the variance within each group is approximately constant. It is clear from inspection of the data that this assumption is probably not fulfilled by these data, since the vertical spread of the cost ratios is much greater in the smaller sized societies than in the larger. The application of Bartlett's test for the homogeneity of a set of variances confirms this suspicion. It is essential, therefore, to examine whether our conclusions about the variation of the cost ratios with size still hold when correction is made for this factor. The appropriate correction is to transform the original data in an attempt to stabilise the variances. It appears from an examination of the data that the standard deviation of the cost ratios within each size group is roughly proportional to the square of the mean cost ratio for the size group. Hence an appropriate transformation is to take the reciprocals of the original observations. Applying variance analysis to the transformed observations in the two classes of Non-Branch and Branch Societies, we find that our original conclusions still hold good, though the level of significance is lower. The variance ratio for the Non-Branch Societies is now significant at 5% level and that for the Branch Societies is still approximately unity and hence non-significant. The reciprocal transformation achieved its objective, as the variances of the transformed data did not differ significantly in either class.

J. JOHNSTON.

University of Manchester.

A Women's Clothing Multiple¹

Great changes have taken place in the women's outerwear industry during and since the War—a post-war survey² of the industry comments “A revolution has taken place behind the smoke screen of war-time conditions and we now have an industry, albeit still young and not yet fully conscious of its own estate.” The “revolution” has affected both manufacture and distribution and one of its most important features is the growing importance of clothing multiple retailers in both these spheres. Statistical evidence of the growth of the multiples can be found in the Board of Trade's figures³ for weekly retail sales, (by value), of women's and children's wear.⁴ Between 1947 and 1950 there was an increase of 118% in sales by multiple firms, and between 1950 and 1954 a further 80%. Similar figures for department stores are 24% and 6%, and for independent retailers 29% and -3%. Comparable figures for the increase in the value of total sales of women's and children's clothing are 38% in the 1947-50 period and 7% in 1950-54.⁵ The quantity figures, (as distinct from index numbers), are not available, but it can be seen that the post-war growth of the multiples has been rapid and out of all proportion to the increase in the value of total sales of women's and children's clothing.

¹This paper is based largely on information collected for a current research scheme on innovations and industrial structure in the women's outerwear industry. The industry is further defined as the making up of outerwear from piece-goods, to exclude hosiery products and boots and shoes, which can be regarded as separate industries. The multiple firm is Marks & Spencer Ltd., who have co-operated most readily with the research and have provided a considerable amount of most helpful information about their trading policy and their internal organisation. I have supplemented this with visits to the factories of several of their suppliers, in the general course of the research, and this has enabled me to secure an all round view of their activities and of their influence on the industry. This research has been made possible by a grant under the Conditional Aid Scheme for the use of Counterpart Funds derived from United States Economic aid.

²*Report on the Present Position of the Apparel and Fashion Industry*, compiled and published by the Apparel and Fashion Industry's Association in 1950.

³These are published monthly, with an annual summary, published in April, in the *Board of Trade Journal*.

⁴Excluding hosiery and boots and shoes.

⁵Based on the figures for the National Income and Expenditure of the United Kingdom compiled by the Central Statistical Office.

Distribution of women's clothing by multiples was a feature of the pre-war industry. Jeffreys¹ estimates their share of total sales of women's and children's clothing in 1938 as 14-16%. There are no figures for their war-time sales, but there seems to be a general impression in the industry that the multiples lost ground in the war years. This can probably be attributed to the loss of branches through bombing, the difficulty of obtaining other premises, because of restrictions on retailing under the Location of Retail Business Order, and the difficulty of obtaining bulk supplies in the period of war-time scarcities and consumer rationing of clothing. But, by 1947, the multiples were beginning to recover their pre-war trading position. In 1947 the value of their sales was 42% larger than in 1938; comparable figures for department stores and independent retailers are 93% and 47%² respectively. After 1947, as has been shown, their development was rapid.

This growth can be attributed to (a) changes in the products of the industry, (b) changes in income distribution, which have led to a price and market structure favourable to the multiples and, finally, (c) a change, amounting to a revolution, in the structure of the making-up industry and in manufacturing techniques.

(a) The utility clothing scheme, initiated by the Board of Trade in 1942 and retained until early 1952, had an important influence on products as it caused most clothing manufacturers³ to concentrate on the production of low to medium priced, relatively standardised clothing, particularly suitable for distribution by multiples. Utility cloth was restricted to a limited range of standard types and colours and this, together with restrictions on styling imposed by the Making of Civilian Clothing (Restrictions) Orders, effectively reduced the wide

¹James B. Jeffreys, *The Distribution of Consumer Goods*, Chapter XXII, p. 322.

²*Cf.* Report on Department Store Trading for the Trade Year 1950, published by the Retail Distributors' Association.

³Production of utility garments was about 80% of total clothing supplies in 1945, and 87% of woollen clothing, 54% of linen and cotton clothing in 1951—*cf.* *Civil Industry and Trade*, E. L. Hargreaves and M. M. Gowing, p. 457 and the *Report of the Purchase Tax/Utility Committee*, cmd. 8452, p. 9.

variety typical of pre-war production. For the first time in the history of the industry manufacturers were able to plan their production for long runs of standardised garments and to place production economies before fashion appeal. Between 1946 and 1952 there were no style restrictions, but utility price control continued and this encouraged manufacturers to produce long runs of relatively standardised utility garments and to restrict their high fashion production to non-utility garments, which sold at prices that appealed only to a relatively small group of wealthy consumers. It was on this post-war utility production that the growth of the multiples was largely based.

(b) The war-time and post-war re-distribution of incomes resulted from wage increases, from changes in the incidence of taxation and from welfare payments, such as subsidised housing and family allowances. The effect of taxation in reducing inequalities in income is shown in the white papers on *National Income and Expenditure in the United Kingdom*. Income re-distribution has caused a change in the structure of the market for clothing. Before the war, there was a large market for cheap clothing, and a relatively small, middle class, market for medium grade clothing. During the war, the market for the cheapest grades of clothing declined as wages increased and as clothes rationing encouraged consumers to demand durability rather than cheapness. There was considerable pressure from the industry for the inclusion of more good quality cloths in the utility range¹ as they found that the demand for cheaper clothing was falling. The biggest demand now is for lower medium grade quality clothing, corresponding to the better-quality utility production, and it is for meeting this demand that most of the productive capacity in the industry is now organised. There is only a relatively small demand for cheap clothing, of comparable quality to pre-war cheap production, and a much

¹The cheaper utility garments had to be down-pointed in September, 1943, i.e. their coupon values had to be cut, as distributors found that they were unsaleable at their current coupon values.

reduced demand for upper-medium grade clothing, comparable to pre-war medium grade production.¹

(c) The changes in products and in market structure have led to corresponding changes in the structure of the industry and in the methods of production. In the immediate post-war period (1946-1950), many firms, which had produced on a small scale before the war, began to expand production, by extending their factories, by acquiring new large factories in the Development Areas, or by transferring their production to other factories outside the main clothing towns, (London, Leeds and Manchester), at seaside resorts, in the outer London suburbs, and in other provincial areas where premises were available for production on a larger scale.² Producers have acquired these bigger factories in order to increase their productive efficiency by developing mass production methods; by using bigger cutting tables, installing band-knife cutters which can cut through much thicker lays than hand-operated electric cutters and by using conveyor belts and other forms of line production to enable the machining of the garments to be highly sectionalised.³ They have found both that it is easier to develop mass-production methods in the new factories, because premises are more suitable, and that local labour conditions have made

¹This change in market structure has been clearly evident in the factories I have visited. Production managers in all factories have stressed the importance of maintaining and improving quality standards to enable their firms to maintain and increase their sales. In factories, which before the war produced medium grade garments, the smallness of the orders placed by individual distributors (mainly department stores) for their garments is a constant production "headache." Many firms have to take orders for single garments, often in special sizes, to offer an exceptionally wide range of standard sizes or guarantee delivery within a week, to keep their factories in production.

²Firms from all the three main clothing districts have opened these factories, but the London producers, in particular, have found that the restrictions on industrial development imposed by the London Plan have made it impossible to extend their London factories and have, therefore, acquired provincial ones.

³There is insufficient space to describe in detail the different machining methods but their general aim is to replace the individual skilled worker, who machines together a complete garment, by groups or teams of semi-skilled workers who each machine a small part of a garment. Sub-division of machining operations both permits the speedy utilisation of "green," or untrained, workers and increases output per worker, as concentration on a small machine operation greatly increases a machinist's speed.

it essential to sectionalise production. Their labour, apart from a few skilled key workers, has all been new to the industry and it has been impossible to provide the long training period necessary before a worker can "make through," that is perform all the machining operations needed to complete the machining of a garment.¹ Before the war, most clothing production was based on the use of skilled workers "making through"² garments and, under those conditions, there was little difference in production efficiency between workers in large or small factories. The development of highly sectional making-up has tended to make the larger factory the more efficient production unit in the post-war period, particularly in the lower medium quality grade for which there is the biggest demand. But, to secure the full production and price advantage from their production methods, firms with the large factories must secure bulk orders for individual styles of garments, both in order to cover the considerable overhead expense of "breaking down" the making-up process for each style into small sections and to provide the machinists with the long run of work necessary before they reach their maximum³ speed of output.

There are no statistics available about the present structure of the women's outerwear industry. From empirical research

¹Most of these producers provide from 3 weeks' to about 3 months' preliminary training for new recruits (these are usually school leavers); a period of 2 to 3 years' experience is necessary before a worker is skilled.

²This was certainly generally true of production in London, where more than half the women's outerwear industry was located before the War. It also seems to have been typical of much production in Leeds and Manchester where some of the biggest pre-war factories were situated. All the ones I visited, with one exception, were "making through" before the war. For the sake of completeness I should perhaps mention that, in the higher quality grade London tailoring factories, there was a form of sectional work before the war. A skilled tailor would recruit his own team of less skilled assistants and together the team would make a complete garment, the tailor performing the more skilled work in the garment and taking the responsibility for quality. There might be several teams organised on these lines in a factory. But this sectional working had little affinity with post-war sectional production, although it still survives in some of the London factories I have visited.

³One production manager of a dress factory told me that his teams of machinists reached their best speeds only after 2 weeks' work on a single style. A run of 2-3,000 dresses of the same or very similar styles is required for full production efficiency in a dress factory of about 100 workers.

it appears that there are still a large number of small factories, particularly in London, employing 25-75, or even fewer, workers. But there has been a considerable post-war growth of factories, mainly in the provinces, employing generally about 200-500 workers, that can only be operated efficiently on the basis of large orders and it is these factories that supply most of the clothing sold by the large multiples.

Firms with large factories are finding it increasingly difficult to market their products through the department stores and the independent retailers. With the return of the importance of fashion and the re-emergence of a buyers' market, particularly since about 1950, these retailers have generally returned to their pre-war practice of giving small orders, holding small stocks¹ and relying on quick deliveries from manufacturers to meet consumers' demands. Manufacturers with large, highly sectionalised, factories cannot sell on this basis without holding stocks of garments and delivering from stock. (The small manufacturer, typical of much pre-war production, has a more flexible production system and can generally make the garments ordered within the delivery period). Holding stocks greatly increases the risk of loss because of the seasonal nature of much outerwear production. Fashion changes tend to make stocks held at the end of one production season generally unsaleable the following season. Retailers are therefore passing trading risks² back to the manufacturers by giving small orders. Marketing difficulties are further increased by the much lessened post-war importance of wholesalers in outerwear

¹Manufacturers have told me that orders given by these retailers are generally smaller in volume and their buying is more "hand to mouth" than was usual before the war.

²The finance required to hold stocks is also a problem for many manufacturers. There are few public companies; most firms are family businesses operating as private companies, and, apart from credit given by cloth suppliers, they rely for working capital mainly on borrowing on overdrafts from the joint stock banks. Bank credit can be more readily obtained to finance production against firm orders from distributors than for production for stock.

distribution.¹ The sellers' market of the war and immediate post-war years encouraged manufacturers to sell direct to retailers and this tendency was encouraged by the utility price control orders, which made it profitable for manufacturers to by-pass the wholesalers. Very little outerwear is now marketed through wholesalers and, when it is, the wholesaler often acts mainly as an agent, carrying little stock and relying on quick deliveries from manufacturers to supply his retail customers. In recent years the larger manufacturers have found it increasingly necessary to carry considerable stocks, which are sometimes handled by a separate wholesale department, or to base most of their sales on the multiples. In the coat and costume, that is, the mantle section of the industry, making for stock has, in the case of some firms, been accompanied by heavy expenditure on consumer advertising to ensure a market for their production; a small number of dress manufacturers also advertise on a large scale. But most large manufacturers of dresses and blouses do not advertise and sell a considerable part of their output to the multiples (as also do a number of mantle firms).

The multiple groups are of various types. One group, with about 50 branches, sells mainly fashion clothing, geared to the "business girl" or stock size market, offering good, lower medium grade garments of considerable fashion appeal, at keen prices. Some other groups are composed of specialist fashion or "madam" shops, as they are called in the trade, operating under different names, but with central buying of stocks. Another group of about 20 large women's clothing shops has a large dress factory and a large mantle factory but also buys a considerable part of its stock from other manufacturers. There are also several groups of variety chain stores, which sell a wide range of products, but have considerably developed

¹A Board of Trade survey of the industry in 1942 (*cf. The Board of Trade Journal*, September 29th, 1945, page 478) estimated that 33% of women's tailored outerwear and 38% of women's dresses were sold through wholesalers. These figures seem to me rather to over-estimate the importance of the wholesaler, even in 1942, and it is probable that some principal firms (who are an important feature of the London industry), were included. These firms are not wholesalers proper but firms who buy cloth, have the garments made up on a contract basis and then market them as manufacturers.

sales of lower-priced dresses and blouses since the war. These multiples all form an important market for the larger manufacturer because their selling policy is based on highly competitive selling prices and they keep down their prices, not only by retailing economies, but also by offering manufacturers the larger¹ orders that enable them to produce efficiently and so cheaply.² The large number of retail shops in many multiple chains enables these firms to distribute these orders over their different shops and still provide the variety of stock in each shop that is so essential for the effective marketing of fashion goods.

Most multiples buy from manufacturers on a seasonal basis, that is, they place their orders either at the beginning or during the course of the two main production seasons. These vary according to the type of clothing made, but extend roughly from mid-June to the end of September, for the autumn and winter season and from mid-November to the end of April, for the spring and summer season. Some multiples place their initial seasonal orders a few weeks in advance of the bulk of the retail orders and so help manufacturers to close the gap between the seasons. But many manufacturers are still faced with the problem of keeping their factories in production in the month or six weeks interval between the main production periods. Before the war, the normal practice in the industry was to close down or put workers on short time. This is becoming increasingly difficult, under conditions of general full employment and of a constant shortage of clothing workers. Factories now have to be kept open throughout the year if an adequate labour force is to be retained. Firms with the larger factories find the burden of overheads and wage payments particularly heavy, because of their bigger administrative and supervisory staffs, their more adequately equipped and lighted factories and much larger factory space per worker. Their losses during a quiet

¹Department stores (unless they belong to a group with central buying arrangements) usually place their orders for different styles in tens, the general run of multiples, in hundreds, and Marks & Spencer, in thousands, so that it is only on Marks & Spencer's orders that the maximum economies of sectional mass production can be secured.

²Firms producing blouses and skirts have estimated that they can sell as profitably to multiples at prices 20% and 15% respectively below their prices to other distributors.

production period are proportionately heavier than for firms with smaller and less adequately equipped factories. Marks & Spencer Ltd. is the only multiple that fully meets their problems by giving not only large orders for individual styles but also long term contracts which ensure work for the inter-seasonal periods.

II.

This firm have gradually evolved a system of trading, based on careful central planning, which enables manufacturers to produce garments with maximum efficiency and so at lowest cost and also co-ordinates supply with demand so that the garments made find purchasers in their stores at the planned prices. This makes it unnecessary to clear old stocks at greatly reduced prices at the half-yearly end of season sales which are an important part of the selling policy of most women's outerwear retailers. This firm's general trading policy can be described as one of enlightened self interest.¹ They appear to have taken an exceptionally clear and long-sighted view of the trading opportunities offered by the post-war development in the industry's products, markets and structure (described above) and to have planned their trading policy to exploit these opportunities for the benefit of the consumer and the manufacturer, as well as for themselves.

Most of their present trading policy for women's outerwear² is of post-war origin. The firm dates from 1884, when their first "penny bazaar" was opened in Manchester. Soon a chain of these bazaars was developed in the northern counties. Two features of current trading methods date from these bazaars, customer selection and a clear indication of price on each article. The penny price limit disappeared in the first world war.

¹As one of their suppliers remarked to me, "They are not a charitable institution." This is supported by the gross profits shown in their yearly company reports:—£4.2m. in 1948-49, £4.7m. in 1949-50, £6.1m. in 1950-51, £5.0m. in 1951-52, £6.7m. in 1952-53, £9.9m. in 1953-54 and £11.2m. in 1954-55.

²I should perhaps mention that women's outerwear is only a part of the merchandise sold by this firm—about 25% of their total turnover, at a guess—and the following discussion of their trading activities relates only to women's outerwear. Outerwear, such as jumpers and stockings, which are products of the hosiery industry are, moreover, excluded from the scope of this paper.

The next important stage in the firm's development was the floating of a public issue of shares in 1926, and this was soon followed by the introduction of a 5/- upper limit on sales, which was retained until 1939. After 1926, sales of the cheaper types of clothing were increased, although during this period and throughout the war the organisation could be described as a "variety chain store," in that a wide variety of products were stocked, including gramophone records, druggists supplies, electric fires and hardware, sales of which have been discontinued since the war. The origin of post-war planning in clothing production and sales can be traced back to the establishment of a Merchandise Development Department in 1937. This department began to order grey cloth in bulk from the weavers, to test samples at a textile research laboratory, which was opened at the firm's headquarters in the same year, and to lay down minimum quality specifications ¹ for this cloth. In the 1930's also, the policy of giving clothing manufacturers long term contracts ² was begun. In this period, also, cloth supplies were planned in advance of clothing contracts so that manufacturers were able to obtain deliveries of cloth as required to meet their contract commitments. But the 5/- price limit permitted little development of sales of any but the cheaper kinds of blouses, dresses and skirts. Low price rather than quality was the firm's main selling policy. During the war, supply and other trading difficulties prevented the firm from developing further its planned production in women's outerwear. The 5/- price limit had to go and a great variety of products, at a wide range of prices, were sold.

With the end of the war and the emergence of easier supply conditions for textiles and clothing, the pre-war cloth buying department and the textile laboratories were re-opened and the present system of planned production and selling for women's outerwear was evolved and the necessary headquarters departments were built up. An important pre-war development which should be mentioned was the growth of the retail branches,

¹I have been told by the firm that these specifications were the basis for some of the war-time utility cloth specifications.

²These contracts were initially for a 2-year period but were extended for much longer periods if the quality of the garments was satisfactory.

which numbered 234 immediately before the war. The possession of such an extensive chain of stores is an essential pre-requisite for the erection of a planning machine, because of the facilities they offer for mass retailing and for direct contact with a large number of retail customers (which affords wonderful opportunities for large-scale consumer research) and also because of the buying power which a large retail chain gives to the headquarters departments.

The year 1949, which brought the end of consumer rationing for clothing, appears to mark the beginning of this firm's present policy for women's outerwear. It was decided that the sale of fashion clothing was to be one of the main activities of the firm. This clothing was, moreover, to be of good quality and quality considerations were to be a major determinant of prices, rather than *vice versa*. Prices were to be keen, but the general policy was to be the sale of good quality clothing of a type which would appeal to the mass of post-war consumers, who provided a demand, not for the cheapest quality grades, but for medium quality garments which offered a combination of reasonable prices, durability and good styling. In 1952, the end of the utility scheme removed from cloth supplies, the distorting effect ¹ of the utility cloth specifications and the cloth buying department was given a new freedom to specify and order a much more varied range of cloths which brought higher standards of durability and attractiveness. Moreover, as they were offered for sale in the shops, it was seen that there was a good demand for better quality garments. Old customers were "educated" to buy these garments by seeing them displayed and a new type of customer, with high quality standards ² but lean purses, was attracted into the stores. In

¹This arose from the identification of the utility mark with freedom from Purchase Tax. The ending of most of the direct war-time controls over cloth production in 1946 brought an artificial scarcity of many types of cloths (particularly cottons) for which utility prices provided an unattractive return to the cloth manufacturers and, at the same time, non-utility cloths could not be used for lower-priced garments because of the high rate of Purchase Tax (33 $\frac{1}{3}$ %) that they attracted. Cf. The Report of the Purchase Tax/Utility Committee, February, 1952, cmd. 8452.

²There is now a big "middle class" demand. A symptom of this is the considerable number of customers who pay for their purchases by cheque.

the last year or so, this policy of "upgrading" merchandise has been further developed and the upper level of prices for dresses, blouses and skirts has been raised to permit the sale of garments of better materials, made to much higher quality standards.¹

"Upgrading" has not been confined to the merchandise offered for sale, the interior fittings of the stores have been greatly improved; special care is taken to ensure that garments are attractively displayed; lighting has been improved. The recent lifting of restrictions on building has enabled the firm to arrange for many extensions to their stores in order, particularly, that the better quality merchandise they are now stocking may be displayed to better advantage and to enable customers to shop in greater comfort.

Other innovations in the last two or three years have been an increase in the size range. No longer are garments made only in "stock sizes." Special ranges of sizes have been introduced for short women, outsize women and "teenagers." In this way the potential market has been broadened, as the requirements of a bigger range of customers are met. The cloths used have also been improved recently, not only by changes in basic specifications but by the introduction of a wider range of colours² and of much more varied designs. Much greater variety has also been introduced into garment styling. These changes, while making the firm's merchandise more attractive to the consumer, have greatly complicated the work of the firm's headquarters planning sections and this seems an appropriate point at which to describe their operation.

The pre-war Merchandise Development Department is now divided into three sections, the Cloth Buying Department, the Print Design Department and the Design Centre. The Cloth Buying Department is responsible for all cloth buying. Their most important function is to place contracts with weavers for cloths made to the firm's own specifications. There are a

¹For example, "Marspun" dresses are priced at 32/11 this year, compared with 29/11 in 1954. This increase in prices has been accompanied by an increase in the amount of cloth used per dress, the introduction of taped waists, better buttons and permanently stiffened, washable belts. A new range of "cottonised" "Marspun" dresses made from better quality cloth and in more fashionable styles is selling at 35/11d.

²This is particularly noticeable in blouses, which until this year were stocked mainly in a limited range of pastel colours.

number of basic cloths and their production is planned with weaving firms, who arrange either to reserve some of their looms for this cloth or to maintain a certain rate of production for it. The "grey" cloth is finished by a number of merchant convertors, on a similar contract system. The Cloth Buying Department works in collaboration with the textile testing laboratories, which provide three main services, research into specifications for new contract cloths, routine testing of deliveries of these cloths, to ensure that they are up to specification, and testing of samples of unspecified cloths. The Print Design Department select designs for printed dress fabrics. Their work is particularly important in connection with cloth for summer dresses and skirts, which are now made in a wide range of prints.

The Design Centre was established in 1948 to co-ordinate the designing of all garments sold in the stores. Its staff has grown from 8 to 100 in seven years. It is responsible for producing original designs, their adaptation into master patterns suitable for mass production and the "grading" of these patterns into separate patterns for different sizes. It also provides makers-up with complete sets of instructions for the making-up of contract garments and, in some cases, model lays for cutting the garments with a minimum wastage of cloth. Not all garments are designed in the Fashion Centre. To secure variety and freshness in styling, clothing manufacturers are encouraged to submit their own designs and, if they are approved, any stocks of cloth held by them are reserved for use of contract production. About 35% of all designs are supplied by manufacturers.

A further post-war development has been the opening of an industrial consultancy department, which co-operates with the textile research laboratories by using sewing and pressing machines to test the suitability of cloths for making-up into garments. The most important function of this department is, however, to experiment with innovations in making-up technique and to help any holders of clothing contracts who ask for their advice about ways of increasing production efficiency.

It is by means of this complicated headquarters machine that production of cloth and garments is planned and supply co-ordinated with demand. Preliminary production plans are made on a yearly basis, with the help of returns of sales from the retail stores. The Cloth Buying Department is responsible for securing adequate supplies of the required types of cloths. The Design Centre prepares a range of styles, using samples of these cloths, and these are inspected by the buyers responsible for placing garment contracts, the final selection of styles being made by a committee composed of the merchandise manager, the buyers and the head of the Design Centre. A preliminary selection is made half-yearly, several months in advance of the production season : for example, designs for this year's summer dresses were being prepared in April last year and the final selection was made by August, when garment contracts were placed with makers-up. Designs for skirts, for sale in the stores from September onwards, had already been passed in April and contracts placed with makers-up. There appears, in practice, to be considerable flexibility in planning and long range plans are combined with short period adaptability to changes in demand. About 50% of the designs prepared by the Design Centre are on this long range basis and about 50% are prepared a little before, or during, the production seasons to meet changes in fashion trends. The use of manufacturers' designs also provides an element of flexibility, as they are usually prepared immediately before or during the main production seasons. Cloth supplies are also not rigidly fixed in advance, because "grey" cloth can be finished in a different print or colour and finished cloth can be used for, say, overalls instead of dresses,¹ if actual demand is seen to be falling below anticipated demand. A fortnightly check is kept on merchandise at the stores ; if there is a tendency for any type of garment to become a "slow seller," contracts are revised and production switched to other lines. The stores also provide an effective testing ground for any new selling lines. These are offered for sale in a few specially selected stores and it is on the result of

¹This, however, is an emergency measure, which may be employed to use up relatively small stocks of cloth, as, in general, dress prints will not be suitable for overall production.

their sales that long-term plans are based. Moreover, during the selling season, manufacturers' deliveries of types of garments which are not selling very well in one store can be switched to stores in other districts.

Long-term planning is thus combined with short-term supply flexibility and strict merchandise control in the stores, to ensure that a minimum of stock remains unsold at the end of a selling season. Trading risks are minimised, so that the retail margin corresponds closely to the costs of distribution (with a margin for profit) and contains only a small provision for the risk of losses on sales of stocks at marked down prices, at the end of the season.¹

The same policy of planning to reduce risks is used to secure economies in garment manufacturing costs and so the keenest manufacturers' prices. The firm owns no factories for women's outerwear production and garments are made by independent manufacturers on a contract system. The most common form of contract is a long-term one. The firm undertakes to keep a certain percentage of a manufacturer's sewing machines in production, with an upper limit of about 75%,² over an initial period of two years, after which contracts are renewed yearly. If the quality of the garments is satisfactory, the contracts are renewed and several firms have now been producing regularly for this firm for many years. Orders for garments are placed with the contract manufacturers in accordance with the long- and short-term plans made at headquarters. When these orders are placed manufacturers are told where to obtain the necessary cloth. The manufacturers buy the cloth at fixed prices and are paid a contract price per garment that includes the cost of the cloth. The contract price is based on costings worked out by the Design Centre before orders are placed.

¹Marks & Spencer, unlike some other fashion multiples and most department stores, do not normally undertake direct consumer advertising to correlate demand and supply. The cost of the central planning departments can therefore be offset against the expenditure on consumer advertising which might otherwise be necessary.

²This limit is part of the firm's policy of ensuring that no manufacturer is wholly dependent on them for work and it has the advantage of encouraging firms to retain their design departments, whose ideas supplement the work of the Design Centre and bring added variety to the styling of Marks & Spencer's garments.

But there is a certain amount of discussion between the firm and the individual manufacturers before the price is finally agreed in each case. This is because Marks & Spencer are anxious that manufacturers should make a reasonable, though not excessive, profit on their production, so that manufacturers will regard contract work as part of their normal output and not an unprofitable short-term expedient to supplement their normal production in periods of slack production.¹

There appear to be some modifications to this long-term contract policy. There is a large group of manufacturers whose quality standards are particularly reliable and whose agreed capacity is kept in full production throughout the year. Other manufacturers are given regular orders, but these orders tend to fall off in the interseasonal slack periods. This second group enjoy the benefits of guaranteed cloth supplies to cover their requirements and the orders given are sufficiently large (250 dozen for dresses appears to be the average size) to enable them to secure considerable production economies.

The garment contract system contains the same elements of long-term planning and short-term flexibility already noted and firms with Marks & Spencer contracts find that, in addition to the production economies obtainable on large orders, their normal trading risks are considerably reduced. Their stability is greatly increased² and the part of their prices which is a cover to meet normal trading contingencies is correspondingly reduced. This explains why contract prices are keen, but yet provide a reasonable margin of profit for the manufacturer.

An important feature of this firm's trading policy, which apart from other considerations, facilitates their planning and is one of the reasons for their prosperity, is the high standards which govern their dealings with both

¹Several suppliers have remarked on the approachability of this firm's staff on pricing. "They are people you can talk to," was one comment. Sometimes suppliers ask for a slightly higher price to permit the use of more material per garment or better buttons which they consider will enable them to produce a better garment for a slightly higher price. This kind of co-operation from suppliers has helped the firm to improve quality standards and is not secured by some other multiple firms who try to cut prices at the expense of quality.

²This is confirmed by the greater willingness of the banks to provide long- and short-term finance for these firms.

consumers and manufacturers. Their aim is to sell garments which will give satisfaction to the consumer, rather than ones that are superficially attractive but unsatisfactory in wear. The result is that they have a growing number of regular customers¹ at their retail stores, whose tastes are known to the selling staff and who form a nucleus of demand in each district. Close contact between local stores and the headquarters staff enables this demand to be used to guide long-term planning. The good and reliable quality standards of their merchandise is having a considerable influence on the general quality of lower priced clothing. It sets a standard which shoppers seek elsewhere and other distributors are trying to secure better quality in the garments they buy. This is having an important effect in preventing a lowering of quality under recent conditions of over-supply and keenly competitive price fixing in the industry, which would otherwise tend to cause reductions in quality² and prices.

Manufacturers also have found that they can trust Marks & Spencer. There is a minimum of formal contracts but all agreements are honoured. This is setting a new standard of business ethics³ in an industry where they have been generally low and it is part of the "revolution" in this industry.

Marks & Spencer and their suppliers are together forming a stable element, trusted by the banks, by suppliers of cloth and of machinery and other equipment, in a notoriously unstable industry and this is having an important effect on innovations in production and productive efficiency generally.

¹This is a point I noted from conversations with sales girls in a local branch store.

²This situation is in contrast to pre-war conditions when over-supply led to severe price-cutting and the production of skimmed and shoddy garments, until the introduction of the utility scheme and rationing led to improvements in quality. On recent visits to the larger factories I have been told that other multiples and some mail order groups (whose production standards tend to be the lowest in the industry) are now insisting on higher quality standards, to make their products more comparable with Marks & Spencer's.

³Manufacturers, in conversation, have contrasted their dealings with Marks & Spencer with their experience of other distributors who, in a bad season, have many methods of evading their commitments—by saying that garments are not up to sample standard, or by not taking delivery of all garments ordered. These methods of trading can be explained by the generally highly risky nature of the fashion trade and by the predominance of a buyers' market.

Efficiency is encouraged by large orders and long-term contracts. Moreover manufacturers have to be efficient to make adequate profits on Marks & Spencer's contracts. Manufacturers find that they can make the maximum use of mass production methods and that the prospect of continuing orders makes it possible and profitable for them to invest capital in the necessary equipment.¹

The industrial consultancy service is bringing a higher level of production efficiency to all contract holders.² Not all of these are large firms, some employ 30-50 workers, but the smaller firms are given orders for a limited range of garments and concentration on these lines and the application of sectional production methods gives them a high level of efficiency. In the clothing industry generally, application of mass-production methods is uneven, even in the larger factories, and contact with the industrial consultancy service is effecting a noticeable levelling-up of production standards.³ This is particularly important in this industry, where there is a shortage of highly-trained technicians (as distinct from craftsmen) and executives, with the knowledge and capacity to organise factories on a mass production basis.⁴ The firm's industrial consultants, moreover, work in close touch with suppliers of clothing machinery and

¹A gloss on this are conversations I had with two manufacturers who did not hold Marks & Spencer contracts. I asked them why they did not undertake this work and one replied that "he would be swamped with work" and the other that "he would have to re-equip his factory with new machines."

²Efficiency is also being encouraged by a growing number of informal contacts between Marks & Spencer's contract holders. They meet at the Marks & Spencer headquarters and often visit each other's factories, when they are in the same district. One regional group of contractors has recently formed a local trade association to ensure that they do not entice away each other's labour and to discuss other matters of common interest. In this way the long standing tradition of secrecy in this industry is being broken down. The main reason for it is the desire to keep styling exclusive. But this does not apply to Marks & Spencer production. The visiting of other factories facilitates the interchange of ideas and so production efficiency.

³This has been particularly evident on visits to factories. All Marks & Spencer's contract holders have a standard of equipment and of organisation of production that is noticeably higher than in the general run of other clothing factories.

⁴This is a problem which the Clothing Institute the British Institute of Management and the authorities responsible for technical education are now trying to solve.

equipment and, by providing these firms with an effective potential demand for improved equipment and often specific production problems to solve, encourage them to experiment with improved production methods. The supply of the necessary finance to instal the better equipment is facilitated by the stability given to suppliers' financial prospects by Marks & Spencer's contracts. Finance for equipment is a constant problem in this industry, where the representative firm is a small private company, frequently under-capitalised and prone to over-trade on capital to meet its working capital requirements. Apart from the brief period of post-war prosperity, when manufacturers invested wartime profits in new equipment, there has been little incentive or opportunity for investment in machinery and equipment¹ except in the case of Marks & Spencer's suppliers.

The cloth testing laboratories are also an important technical innovation in this industry, where there is only one other laboratory which operates on a much smaller scale. The Joint Clothing Council might have developed a central service of this kind, but it had to be wound up last year, after the withdrawal of two of the main trade associations. There are many textile research laboratories, supported by the cloth manufacturers, but no central research authorities to form a link between their researches and the making-up industry. This tends to hinder the use-development of the new man-made fibres and the many new finishes that are being developed for rayon and cotton fabrics. The scientific terms, in which the properties of the new fabrics are described by the textile technicians, frequently need interpretation to enable clothing manufacturers to understand them sufficiently well to make the necessary adjustments to machinery and pressing equipment, and to decide on their suitability for making-up into the various types of clothing. Moreover, there is in general no direct transmission back to these laboratories of difficulties and defects which have become apparent either in the making-up or wearing of a garment. Marks & Spencer's laboratories to some extent

¹There are, of course, exceptions to this generalisation, but it is particularly applicable to light clothing (dresses and blouses) production, where Marks & Spencer exert the most influence.

fill this gap in communications. They work in close touch with all the textile research laboratories and have materially assisted in the development of apparel cloths from the new fibres. For their clothing manufacturers they provide some guarantee that fabrics will be suitable for the types of clothing for which the planning authorities place contracts. Where fabrics prove unsatisfactory in use (that is, in cases where customers return garments to the stores) they test the fabric again and report their findings to the textile laboratories. This firm's textile technicians have, moreover, undertaken some invaluable pioneer work in establishing minimum performance standards for apparel cloths and in developing the necessary machinery for performance testing.

In sizing also, this firm have undertaken some important research which is of value to the industry as a whole. They have measured thousands of their customers and it is on the basis of these measurements that the Design Centre grade their patterns. Their method of selling, which provides no facilities for the trying on of clothing before purchase, makes careful sizing essential to minimise misfits. But to the manufacturer also standardisation of sizes is becoming increasingly important, as mass-production does not permit the making on an economic basis of single garments in special sizes, so that their contract holders reap considerable benefit from their sizing researches, the results of which can be applied not only to contract work but also to other production.

It can be concluded that this firm have exerted a large and beneficial influence on standards of quality, sizing and productive efficiency generally and have brought a considerable measure of stability to the producers of dresses, blouses and skirts in the post-war period. Moreover, they appear to provide a most important market for the products of the larger factories,¹ whose marketing difficulties were discussed earlier in this paper. Their activities have been developing rapidly in recent years and are still expanding. Their merchandise now competes with many of the types and quality grades of garments sold by the department stores. They have, as yet, made little

¹I have visited a number of these factories and most of the factories visited hold Marks & Spencer's contracts.

impact on the heavy clothing side of the industry, which produces coats and costumes, although some of these manufacturers make skirts for them. They have noticeably, in the past year, ventured into quality and price ranges where fashion appeal is increasingly important and where fashion changes make long-term planning particularly difficult. In planning the production of higher priced garments, flexibility will become increasingly important, as, the higher the price of a fashion garment, the more important it is to follow the current fashion trends in fabrics, colours and styling and the greater the danger that rigid adherence to long-term plans may result in the accumulation of unsaleable stocks. There are no figures available to indicate the present extent of this firm's share of the women's outerwear market. But it is safe to assume that they are by far the largest distributors of dresses, blouses and skirts in this country and that their share of a market, which as a whole is relatively static,¹ will continue to grow. If this firm can continue to apply its policy of central planning to reduce production and selling risks on garments in the higher price ranges to which they are now extending their activities, they will make a unique contribution to stability and technical progress (as well as consumer satisfaction) in an industry in which trading conditions are otherwise not generally favourable to improvements in quality standards or efficiency in production.

MARGARET WRAY.

*University College,
London.*

¹Cf. "More Money, Less Clothes," by Mark Abrams, *The Financial Times*, 1st October, 1955.

A Note on Managerial Incomes in Retail Distribution

The Census of Distribution ¹ allows us to ascertain within broad limits the averages of managerial salaries paid in various types of British shops, as well as the averages of that part of the working proprietor's income which is due to his services, as distinct from profits.

The following assumptions have to be made :

- (1) "Part-time" staff is paid at half the rates of full-time staff, and is half as productive.²
- (2) Retailing firms "with Working Proprietors" are exactly alike in capital structure, wages costs, efficiency, etc. to retailing firms "without Working Proprietors" ³ of the same size, as measured by turnover, and of the same trade group; the only differences being that one type is managed by a proprietor (or proprietors), the other by a salaried manager (or managers) and that their price policy may vary. In particular,
- (3) The wage levels of similar shops in similar trades are alike for owned and managed shops.

None of these assumptions is likely to be fully justified, but in no case is the error likely to be great. Assumption (1), in particular, only affects a fraction of the staff (about 15%) except in the newspaper trade, where paper delivery is likely to distort the picture to a considerable degree, and the error would be important only if the practices of owned and managed shops differed in this respect. The other assumptions are also unlikely to show very wide errors. For the purposes of this note, an accuracy in the result of $\pm 25\%$ would be sufficient.

¹*Census of Distribution and other Services*, 1950, Vol. 2 : Retail and Service Trades, General Tables. All figures in this Note are drawn from this volume and refer to 1950. The authors are indebted to Prof. E. Devons and to Miss M. D. Kennedy, of the Board of Trade, for valuable suggestions concerning the argument of this paper.

²All calculations in this paper assume a "standardised" working force, arrived at in this way.

³For the sake of convenience, these will be distinguished by the terms "owned" and "managed" firms and shops respectively.

All the calculations in this paper have been applied to firms in nearly all trades in two important size groups, those with turnovers of £5,000 and under £10,000 per annum, and those with turnovers of £10,000 and under £25,000; and to all size groups in four important trades, grocery, other food, clothing and furniture. They may be applied with equal facility to any other sub-division of retailing firms.

On our assumption, the pay-rolls of owned and managed shops otherwise similar would differ only by the amount of the manager's salary included in the latter. Assuming all other wages rates per head to be equal in both types of firm, the average pay per head in the managed firm would be raised by the excess of the manager's salary over the average wage paid: this excess, multiplied by the average number of employees per firm, is imputed to the manager(s) and added to the average wage, to give his salary.¹ The results are shown in Table I; it should be noted that the "manager" may be more than one person, just as there may be more than one "working proprietor" per firm.

Omitting the largest² and the smallest size-groups, for which the samples were too small to be significant, imputed

¹If W = Total wage bill of sub-group of firms,
 L = Total standardised working force (i.e. part-time = $\frac{1}{2}$) of sub-group,

F = Total number of firms in sub-group,

o = owned firm,

m = managed firm,

then

W_m

$\frac{W_m}{L_m} = w_m$ = average wage in managed firms,

L_m

W_o

$\frac{W_o}{L_o} = w_o$ = " " " owned " " , and $w_m > w_o$.

L_o

The average imputed managerial income is given by :

$$X = w_m + \frac{(w_m - w_o)}{F_m} L_m$$

²The figures for the largest size groups are not unrealistic. A recent calculation by the Research Department of U.S.D.A.W. has shown the average payments to about 1,400 directors in 266 joint-stock retailing firms to have been about £3,500 p.a. in 1949-51. The highest average payments were found in Footwear (£5,100), Drapery and Department Stores (£4,250) and in Tobacco, Sweets, Newsagents and Books (close on £3,500). U.S.D.A.W., *Report upon Remuneration of Directors in Retail Trades*, March, 1955 (duplicated).

TABLE I
IMPUTED AVERAGE INCOMES OF SALARIED MANAGERS IN RETAIL
DISTRIBUTION (£ p.a. per firm)

Firms by Trade

	Firms with sales £5-10,000	Firms with sales £10-25,000
Grocery	270	450
Other Food	330	510
Confect., Tob., Newsagents	280	430
Clothing	480	790
Hardware	430	730
Books, Stationery	650	1,000
Chem., Phot. Goods	850	480
Furniture	490	730
Jewellery, Leather	570	910
Coal ¹	320	380

Firms by Size

Turnover of :	Grocery	Other Food	Clothing	Furniture
1. Under £1,000	120	110	110	180
2. £1,000 and under £2,500		170	180	240
3. £2,500 " " £5,000	200	240	290	280
4. £5,000 " " £10,000	270	330	480	490
5. £10,000 " " £25,000	450	510	790	730
6. £25,000 " " £50,000	620	630	1,300	1,100
7. £50,000 " " £100,000	700	820	1,800	1,900
8. £100,000 " " £250,000	1,100	1,000	1,700	7,100
9. £250,000 " " £500,000	1,500	2,000	2,700	
10. £500,000 " " £1 mn	2,800	— ²	— ²	
11. £1 mn and over				

Source : Census of Distribution, Vol. 2, Table 27.

managerial incomes show, as was to be expected, a steady increase with the size of firm. They also show variations as between trades; booksellers, jewellers, chemists (a doubtful case), furniture and hardware dealers and managers of clothing shops stand out as receiving high incomes, while grocery, other food sellers, tobacconists and coal merchants are, by comparison, poorly paid. These variations are significant (even on the assumption of an accuracy of only $\pm 25\%$), for the four poorly paid trades combine, in almost every case, relatively

¹This is a sub-group of the Census; all others are trade groups.

²A minus figure would result.

low average wages for all grades, small numbers of assistants for a given turnover, and limited professional qualifications of the managers.¹

The results obtained in Table I are not too reliable by themselves, since the method of calculation greatly exaggerates any divergence from the assumed identity of wage levels in the final result, and too close an agreement in the basic wage figures cannot be assumed.

They are, however, broadly borne out in a striking way by a different kind of calculation. This second method attempts to calculate the managerial wage saved by working proprietors by virtue of engaging in management themselves, or, putting it in different terms, the annual salary which can be imputed to working proprietors as rewards for their own services. The assumption this time, however, is not an identity of wages per head as between the two types of firm, but an identity of wage and salary costs as a proportion of turnover.

Since the working proprietor does not pay wages to himself, his wage bill, for a given turnover, will on our assumptions be lower than that of the managed firms, and the aggregate of this difference for any group of firms, divided by the number of firms, will give the average imputed salary of management of

¹The computed salaries may be compared with the *minimum* salaries laid down by the Wages Boards for the same period. These are given below for the average of shops within the range of turnover of £5,000-£10,000, weighted roughly for area and sex.

Table I Results.

		Minimum Salaries.
Grocery	270	273 Retail Food (England & Wales)
Other Food	330	289* Retail Meat (" ")
Confec. Tob. Newsag.	280	263 Newsag. Tob. Confec. (" ")
Clothing	480	278 Drapery (Great Britain)
Booksellers, Stationers	650	289** Bookselling (" ")
Furniture	490	274 Furnishing (" ")

* These rates were raised twice in the course of 1950, in February and October.

** Only one rate given, irrespective of turnover.

Minimum rates, as might be expected, show much smaller variations as between trades than actual salaries paid. The latter, moreover, are calculated per firm, not per head, and may thus refer to more than one person, though in the range of turnover of £5,000-£10,000 few firms are likely to have more than one manager: the average number of branches per firm in this size group in all trades was 1.07.

the working proprietor(s) in each firm.¹ The groups of firms for which details are given in Table II are the same as those selected in Table I, and similar qualifications apply.

TABLE II
IMPUTED AVERAGE MANAGERIAL INCOMES OF WORKING PROPRIETORS
IN RETAIL DISTRIBUTION (£ p.a. per firm)

Firms by Trade			Firms by Size				
	Firms with sales £5-10,000	Firms with sales £10-25,000	Size groups by turnover ²	Grocery	Other Food	Clothing	Furniture
Grocery ...	340	560	1. }	110 {	90	80	100
Other Food ...	410	650	2. }		180	200	260
Confec. Tob.							
Newsagents ...	190	500	3.	190	270	330	400
Clothing ...	600	900	4.	340	410	600	680
Hardware ...	350	850	5.	560	650	900	900
Books, Station. ...	560	860	6.	890	800	1,600	1,600
Chem. Phot.G. ...	740	1,100	7.	1,000	1,100	2,100	1,900
Furniture ...	680	900	8.	2,200	1,800	3,100	3,600
Jewellery, Leather	580	900	9.-11.	3,500	16,000	3,000	10,200
Coal ...	310	440					

Source : Census of Distribution, Vol. 2, Table 27.

Again, these figures show a certain regularity. Managerial incomes rise with the size of firms. In the comparison between trades, booksellers, jewellers, chemists, furniture and hardware dealers and owner-managers of clothing shops receive the highest incomes, in much the same rough order (the odd results for chemists' and photographers' goods in size range £10-25,000 in Table I has now been ironed out). On the other hand, coal merchants, tobacconists, food sellers and grocers, in the same order, are the worst recompensed.

¹Symbols as above, with the addition :

S = Total Sales of sub-groups of firms.

Then $\frac{W_m}{S_m} = r_m$, the ratio of wages to sales in managed shops.

$S_o \times r_m > W_o$, and

$(S_o \times r_m) - W_o$

$\frac{\quad}{F_o}$ = imputed income for services of working proprietor(s) per firm.

²As in Table I.

It is possible to make the figures of Table II somewhat more realistic by calculating imputed managerial incomes per head, instead of per firm. Unfortunately, no separate statistics of working proprietors are given, but incomes per "working proprietor and unpaid helper" may easily be obtained by deflating the results of Table II by the ratio of working proprietors and unpaid helpers per firm, for each class of firm. The results of this calculation are shown in Table IIa. While introducing a further possible source of error (it is likely, for example, that "unpaid helpers" form a larger proportion among grocers or confectioners than among chemists or furniture dealers, so that the incomes of the former will have been unduly deflated), the amended calculation shows results sufficiently close to the original table to leave the conclusions drawn from the latter unaltered. The similarity of Tables I, II and IIa (omitting largest and smallest firms) is close enough to lend them some credence, within broad limits, particularly as Tables I and II were constructed by quite different methods.

TABLE IIa
IMPUTED AVERAGE MANAGERIAL INCOMES OF WORKING PROPRIETORS
AND UNPAID HELPERS IN RETAIL DISTRIBUTION
 (£ p.a. per head) ¹

	Firms by Trade		Firms by Size				
	Firms with sales £5-10,000	Firms with sales £10-25,000	Size groups by turnover ²	Grocery	Other Food	Cloth- ing	Furni- ture
Grocery ...	230	370	1. }	90	{ 80	80	90
Other Food ...	280	430	2. }		{ 140	170	200
Confec. Tob.							
Newsagents ...	130	340	3.	140	190	250	280
Clothing ...	430	610	4.	230	280	430	470
Hardware ...	240	550	5.	370	430	610	580
Books, Station. ...	380	570	6.	560	480	1,000	1,200
Chem., Photo.G.	620	870	7.	570	630	1,200	2,000
Furniture ...	470	580	8.	1,300	960	1,600	5,400
Jewellery, Leather	410	620	9.-11.	2,100	5,700	1,400	
Coal ...	220	290					

Source : Census of Distribution, Vol. 2, Table 27.

¹Part time = one-half.

²As in Table I.

We cannot, however, postulate complete identity as between the two types of firms : the Census shows a significant difference in price policy, as expressed in the ratio of gross margins to total turnover. The differences are not large, and in virtually every case (omitting the largest and smallest firms, and trades in which the owner-manager is likely to be engaged, in part, in repair work, as in jewellery and leather goods) the gross margins of managed shops are higher than those of owned shops, the typical difference being of the order of 10%.

"Price policy," in this connection, has to be understood in a wide sense, including not only the charging of higher margins, but also the deliberate concentration on goods with high margins. The former was possible only in trades in which retailers had a large degree of freedom of pricing. A comparison of some of those trades with others in which prices were generally fixed shows the following results :¹

	Total Sample	Number of size groups in which margins of managed shops were			Unweighted mean excess of margins of managed shops over those of owned shops (% of sales)
		higher (compared	lower with owned shops)	equal	
Sub-groups with mainly fixed margins ² ...	53	34	18	1	1.1
Sub-groups with mainly free margins ³ ...	53	44	8	1	2.1

The extent to which owner-managers were willing to charge lower margins may easily be measured by comparing the ratios of gross margins of owned and managed shops and distributing the deficiency among the owned firms in a particular group. Table III shows the incomes foregone by working proprietors (on the assumption of complete identity between the two types of firms in all other respects), again expressed as

¹Source : Census of Distribution, Vol. 2, Table 28.

²Off-licences, confec.-tob.-newsagents, tobacconists, tob.-newsagents, radio and electr. goods, books and stationery, coal.

³Fishmongers and poulterers, greengrocers and fruiterers, greengrocers and fruiterers with fish, women's outerwear, women's outfitters, milliners, fancy goods, florists.

an annual figure, for the same group of firms as in Tables I and II.¹

TABLE III
IMPUTED INCOMES FOREGONE BY WORKING PROPRIETORS IN RETAIL DISTRIBUTION (£ p.a. per firm)

Firms by Trade			Firms by Size					
	Firms with sales £5-10,000	Firms with sales £10-25,000	Size groups by turnover ^a	Grocery	Other Food	Cloth- ing	Furni- ture	
Grocery ...	140	290	1.	} 20	20	— ^a	10	
Other Food ...	200	380	2.		40	30	50	
Confect., Tob.,			3.		80	100	130	
Newagents ...	20	130	4.	140	200	220	320	
Clothing ...	220	300	5.	290	380	300	370	
Hardware ...	160	280	6.	460	490	1,000	890	
Books, Station. ...	450	650	7.	330	820	1,700	1,000	
Chem., Photo.G. ...	80	50	8.	1,800	1,300	3,200	3,300	
Furniture ...	320	370	9.	7,600	20,000	7,700	} 10,000	
Jewellery, Leather	150	320	10.	} 15,000	79,000	— ^a		
Coal ...	20	10	11.					

Source : Census of Distribution, Vol. 2, Tables 27 and 28.

The results, again, and with the usual exceptions show a certain regularity and reasonableness which tend to support the assumptions made, though, as before, individual figures should not be credited with too great an accuracy. It is, of course, not possible to determine by any method of manipulating the statistical returns to what extent owner-managers consider they are, by virtue of their price policy, foregoing salaries⁴ and to what extent they are foregoing returns on capital ;

¹Symbols as above, with the addition : G = Total gross margins of sub-group of firms.

Thus G_m

$\frac{S_m}{S_o} = P_m$, the rate of gross margins in managed shops,

$S_o \times P_m > G_o$ in most cases, and

$\frac{(S_o \times P_m) - G_o}{F_o} =$ imputed amount of income foregone by the working proprietor(s), per firm.

²As in Table I.

³Negative figure.

⁴If they are consciously accepting lower salaries as part of their price policy, any conclusions drawn from Tables II and IIA will have to be correspondingly modified.

it is, in fact, doubtful, if many of them are in their own minds separating the two forms of income. Most of them, it may be suspected, look to their shops for a net income which they are trying to maximise without assigning it to different sources. The owner-managers of small, single shop firms may well look upon the whole of it as a salary, those of large firms, multiples or large shops more as a profit on capital. In either case, the working proprietors may fail to look to the sum of profits plus salaries of their trade and turnover, which owners and managers as separate individuals would demand, and pitch their expectations for the combined income lower than the latter.

It will be apparent that all three Tables stand or fall together with the correctness of the same assumptions. If it could be shown that there are inherent differences between owned and managed firms in the same trade sub-groups, other than those of price policy (*i.e.* gross margins charged), all Tables would equally lose their usefulness. It may be stated, however, that the results of the Tables provide mutual support. The regularity and reasonableness of the figures of Tables I and II encourage the belief that the differences in gross margins, used in Table III, are due, in the main, to no other factors than those of price policy; if, for example, they were due to factors such as differences in services provided, capital structure, and location, it would be unlikely that these would be so evenly spread among the different trade groups and size groups as to produce credible results in Tables I and II. On the other hand, Table III tends to provide support for the other two Tables, for the reasonableness of its results lends colour to the belief that it is not in the cost and wage structure in which owned and managed shops differ (since these kinds of differences would be bound to show great variations as between trade groups and size groups), but solely in price policy, which is, in turn, a reflection of modified income expectations.

SIDNEY POLLARD,
J. D. HUGHES.

University of Sheffield.

The Development Areas: A Further Note

I.

In the January, 1955, issue of the *Manchester School*,¹ Professor Sykes examined some of the results of the Distribution of Industry Act 1945, particularly in so far as they affected the economic life of the Development Areas between that date and 1953. The purpose of this note is to provide supplementary statistical information about some of the employment and industrial trends referred to in this earlier article, which it will be seen, in the main, substantiates the arguments put forward by Professor Sykes.

II.

In May, 1953, the Development Areas² employed nearly $3\frac{3}{4}$ million people. Between 1939 and this date, total employment in the seven scheduled regions rose by 197,000 or 5.6% : this compares with a national increase during the same period of 14.3%. The size of the male labour force actually fell by 77,000 or 2.9% (compared with an expansion of 7.4% for Great Britain), but this was more than offset by an increase of 274,000 or 30.8% in the number of female workers employed (compared with 30.0% for the country as a whole). Resulting from these trends, the Development Areas' share of the national labour force decreased from 18.2% in 1939 to 16.8% in 1953. For male labour alone there was a downward movement from 20.5% to 17.2%, whilst the female employment share rose slightly from 14.9% to 15.8%. For every 100 men employed in the Development Areas in 1939, there were 29 women ; by 1953 this figure had risen to 46.

Partly these changes reflect the recent slower rate of population growth in the Development Areas as compared with

¹See "Some Results of Distribution of Industry Policy" by J. Sykes, *The Manchester School of Economic and Social Studies*, Vol. XXIII, No. 1, January, 1955.

²Throughout this article no account is taken of the N.E. Lancashire Development Area scheduled by Parliament in January, 1953.

the country as a whole. For example, between 1931 and 1951, whilst the total population of Great Britain grew by 9%, that of the Development Areas grew by only 1.6%.¹ Table I, which

TABLE I
RELATIVE CHANGES IN POPULATION GROWTH IN DEVELOPMENT AREAS
AND GREAT BRITAIN. 1931/51
(1931 = 100)

Development Area	1939			1951			% change 1931/51		
	M.	F.	T.	M.	F.	T.	M.	F.	T.
North Eastern ...	90.6	94.9	92.7	99.0	102.7	100.9	-1.0	+2.7	+0.9
South Wales ...	92.0	98.7	95.4	94.8	100.4	97.6	-5.2	+0.4	-2.4
Scottish ...	96.2	99.3	97.8	102.6	105.5	104.2	+2.6	+5.5	+4.2
West Cumberland	99.1	103.0	101.1	104.6	104.6	104.6	+4.6	+4.6	+4.6
Wrexham ...	99.9	109.1	104.3	104.1	112.9	108.3	+4.1	+12.9	+8.3
South Lancashire ...	95.4	99.7	97.5	100.4	104.8	102.7	+0.4	+4.8	+2.7
Merseyside ...	93.1	97.0	95.2	106.3	105.7	105.9	+6.3	+5.7	+5.9
All Development Areas ...	93.4	97.9	95.7	99.9	103.5	101.6	-0.1	+3.5	+1.6
Great Britain ...	99.6	103.6	101.7	109.3	108.7	109.0	+9.3	+8.7	+9.0
% G.B. rate of increase.									
D.A. rate of increase.	6.6	5.8	6.3	9.4	5.0	7.3			

Source : Censuses of Production, 1931 and 1951. National Register, 1939.

N.B.—National Register figures are given for relative comparisons of rates of change only.

illustrates these trends, also shows the difference in the rate of growth as between the sexes. Whilst the male population remained almost constant over the period in question, the

¹For comparative purposes, the geographical coverage of these areas, in both years, is taken to be that which existed in 1951.

female population increased by 3.5%. This movement is evident both during the 1930's and the post-war period. During the earlier years, Great Britain expanded her population relatively more quickly than the then "Special Areas"; there was, for example, a substantial migration of both male and female labour from these regions of exceptionally heavy unemployment to the Midlands and the South where the "newer" industries were expanding the most rapidly. It is estimated that some 300,000 people migrated from the North-Eastern counties and South Wales alone between 1931 and 1939. In more recent times, it seems that this outward drift towards the South and East has continued in respect of the male population, but has been somewhat stemmed in as far as the female population has been concerned: indeed, the figures in Table I suggest that the female population of the Development Areas has grown more rapidly than that of the country as a whole since 1939.¹ One possible reason for this is that the war and early post-war years encouraged the occupational and geographical mobility of male labour, both as regards the "power" as well as the "will" to move. Thus, single men tended to return to, and settle down in, their home towns in the Development Areas less than did men in other regions. Age distribution statistics would seem to support this explanation. These show that, though the balance of the working population has not altered much either in the Development Areas or in Great Britain as a whole since 1931, there has been quite a considerable movement in the male labour force of the former areas as between the ages of 25 and 44. When, for example, one compares the relative change in the age distribution percentages of the male population for the groups under 15 and 15/24 for 1931 and 25/34 and 35/44 for 1951,

¹It is also interesting to look at the comparative figures for the regions immediately surrounding the Development Areas. For example, in the "Rest of Scotland," the male population grew by 6.8% between 1931 and 1951, the female population by 5.8% and the total population by 6.3%; the corresponding figures for the "Rest of Wales" were 5.9%, 3.8% and 4.8% and for the "Rest of the Northern Region" 13.1%, 8.7% and 10.9%. These trends—particularly the notable increase in male figures—suggest that part, at least, of the recent migration from the Development Areas has been quite strongly localised in character.

one sees the trend towards an older age structure rather more marked in these regions than in the country as a whole.

TABLE II
PERCENTAGE OF TOTAL MALE POPULATION

	Age Group	1931	Age Group	1951
Development Areas	0-14	28.7%	25-34	15.1%
	15-24	17.9%	35-44	14.8%
Great Britain	0-14	25.5%	25-34	14.8%
	15-24	17.9%	35-44	15.7%

From the view-point of man-power statistics, these population changes have most certainly meant a reduction in the male labour force available for work, which has been only partially offset by an increase in the supply of female labour.

Both the population and the employment statistics—the overall figures for the latter are shown in Table III—also illustrate individual regional movements. Here, South Wales, the least diversified and, perhaps, least prosperous Development Area before the war—yet at the same time geographically the nearest to areas of expanding industry—is shown to have suffered the most in its loss of male population, and to have gained the least in its female population. Yet, because there were so few employment opportunities in this region for women in 1939, the relative growth in the female labour force has exceeded that of other areas. For example, before the war, for every 100 men employed in the South Wales Development Area, there were but 15 women: by 1953 this figure had risen to 35. What is true of this region is also substantially true of the West Cumberland and Wrexham Development Areas. On the other hand, the more diversified and relatively more prosperous areas in 1939 have benefited most from an increase in population, yet least from new employment opportunities made available for women.

TABLE III

RELATIVE CHANGES IN NUMBERS EMPLOYED IN THE DEVELOPMENT AREAS
AND GREAT BRITAIN, 1939 = 100

Development Area	1945			1953			% Change 1939/53		
	M.	F.	T.	M.	F.	T.	M.	F.	T.
North Eastern ...	82.1	166.5	96.9	100.1	152.9	109.6	+0.1	+52.9	+9.6
South Wales ...	79.9	216.3	97.9	93.6	183.1	105.8	-6.4	+83.1	+5.8
Scottish ...	77.3	118.5	89.3	95.9	114.2	101.4	-4.1	+14.2	+1.4
West Cumberland	84.8	226.3	103.2	104.2	206.5	117.8	+4.2	+106.5	+17.8
Wrexham ...	80.4	310.5	104.4	102.7	222.0	115.3	+2.7	+122.0	+15.3
South Lancashire...	69.9	126.1	83.7	90.6	122.9	98.6	-9.4	+22.9	-1.4
Merseyside ...	73.5	112.6	85.8	99.4	114.4	104.1	-0.6	+14.4	+4.1
All Dev. Areas ...	78.5	139.2	92.4	97.1	130.8	105.1	-2.9	+30.8	+5.1
Great Britain ...	78.0	127.9	96.8	107.4	130.0	114.3	+7.4	+30.0	+14.3

Source :—All figures contained in the above and subsequent tables are derived from official Ministry of Labour Statistics and are based on the "new" coverage of insurance statistics. 1939 and 1945 figures have been estimated by multiplying the actual employment in these years by the corresponding 1948 "new" coverage employment figures.

1948 "old" coverage employment figures. This has been done for each Development Area and—in Tables IV/VI—for each main industrial group.

The implication of the employment trends shown in Table III, which, it should be noted, reflect the *increased utilisation* of man-power as well as changes in its *size and composition*, can perhaps best be appreciated by studying the changes which have occurred in the industrial distribution of the labour force. Table IV, shows the relative growth (or decline) of employment in the main Standard Industrial Classification groups for the Development Areas and the country as a whole. These groups are further classified according to their *national* rate of expansion (or contraction) between 1939 and 1953, male and female figures being separately given.

TABLE IV

CHANGES IN RELATIVE NUMBERS EMPLOYED IN THE DEVELOPMENT AREAS¹
AND GREAT BRITAIN BY INDUSTRY GROUP—1939/1953. (1939 = 100)

	Men		Women		Total	
	Dev. Areas	G.B.	Dev. Areas	G.B.	Dev. Areas	G.B.
Average Expansion for all industries	96.7	107.4	135.4	130.0	105.8	114.3
Group A.						
<i>Industries which have expanded nationally above the average.</i>						
Professional Services, including Public Admin. and Defence ...	111.8	135.7	207.3	311.4	143.9	176.7
Electrical Products... ..	547.6	160.3	1940.0	169.4	908.6	164.0
Vehicles	240.3	144.3	449.9	224.7	247.3	152.6
Chemical and Allied Trades ...	147.2	140.5	238.3	161.4	162.6	146.0
Shipbuilding and Engineering ...	172.6	130.7	229.8	240.0	177.3	139.7
Public Utility Services (including Transport and Communications)	125.5	124.0	312.0	278.0	136.5	134.1
Group B.						
<i>Industries which have expanded nationally around the average.</i>						
Food, Drink and Tobacco	128.4	122.4	132.3	117.3	129.5	120.1
Metal Goods (not otherwise specified)	130.7	121.6	212.4	115.7	149.3	119.4
Metal Manufacture	106.4	111.8	234.5	235.9	111.3	119.3
Group C.						
<i>Industries which have expanded nationally below the average (or contracted).</i>						
Agriculture, etc.	72.6	99.4	96.3	138.7	75.4	103.4
Mining and Quarrying	78.9	97.6	185.9	143.6	81.0	100.3
Other manufacturing industries ...	110.9	104.6	144.2	100.1	116.8	103.0
Building and Contracting	83.5	97.2	175.3	195.7	85.1	99.0
Miscellaneous Services	61.1	68.9	116.1	105.8	94.1	92.3
Clothing	114.8	83.4	167.9	87.1	155.2	86.0
Distributive Trades	64.8	68.1	101.4	105.2	81.6	82.6
Textiles	114.2	90.3	89.0	77.6	96.8	82.4

¹Excluding the Merseyside and North Lancashire Development Areas.

Here it is clear that it is those industries where the national rate of employment growth has been above average, which have also expanded the most rapidly in the Development Areas, and particularly is this emphasised when female employment

trends are viewed separately. Professor Sykes has already illustrated in more detail some of the more important newer industries within these groups, *e.g.* nylon, refined petroleum, electronics, etc.,¹ most of which are likely to be of increasing importance to Britain's economy in future years. In fact, though, as he points out, these newer trades accounted for only 12% of the total labour force in the Development Areas at the end of 1953, they accounted for some 35-40% of the *increase* in employment between 1939 and that date.^{2, 3} For example, the electronics, aircraft manufacturing, synthetic fibres, light chemicals, office equipment and precision instruments industries, between them, expanded their numbers by over 100,000. That many of these products themselves requiring new production methods, are essentially new techniques and processes, has been of vital importance in so far as they have enabled the efficiency of the older industries in these areas to be increased. Clothing seems to be the only case in point of an industry which has expanded rapidly in the Development Areas, but has contracted from the national view-point: largely it appears, the rapid expansion of existing firms—first established in the 1930's—and the fact that many of the post-war entrants set up have been *transfers* from existing premises in other parts of the country—or new enterprises altogether—rather than *branches*, is the explanation of this fact.

¹See Sykes, *op. cit.*, especially footnotes to pages 6 and 7.

²For example, on page 13 of his article (*op. cit.*) Professor Sykes says—
“... the Areas' basic industries of coal-mining, iron and steel and other metal manufacturing, engineering, shipbuilding, vehicles, other metal goods, chemicals and tinplate actually increased their labour force from 1,116,000 in 1948 to 1,152,000 in 1953. This rise of 3.2% was larger than that of 2.8% in the Areas' total insured numbers.” True, but *within* these broad groups (and how far is it right to treat the vehicles industry as one of the basic industries of the Development Areas) are in fact most of the “newer” industries, such as have already been mentioned, and these were largely responsible for the rise in the labour force between the above years.

³These measurements of industrial growth by labour force movements should be treated with some caution. No account has been taken, for example, of *productivity* improvements which *may* have been relatively more important in certain of the “older” industries,—particularly in those such as the distributive trades and public utilities services, which had a good deal of surplus capacity before the war. Yet, taking national production indices as a guide, it would seem that the argument in the text is substantially valid.

TABLE V
INDUSTRIAL DISTRIBUTION OF LABOUR FORCE IN DEVELOPMENT AREAS¹
AND GREAT BRITAIN—1939/1953

Industrial Group	Dev. Areas		Women % to all workers	Gt. Britain		Women % to all workers
	1939	1953	1953	1939	1953	1953
Group A.						
<i>Industries which have expanded nationally above the average.</i>						
Professional Services, including Public Admin. and Defence ...	9.9	12.6	48.5	9.9	15.8	46.2
Electrical Products... ..	0.2	1.2	55.4	1.4	2.0	41.6
Vehicles	1.2	2.6	14.2	4.5	4.8	15.3
Chemical and Allied Trades ...	2.0	2.9	20.1	1.8	2.3	28.9
Shipbuilding and Engineering ...	7.0	11.1	11.0	6.2	7.6	14.9
Public Utility Services (including Transport and communications)	8.9	10.8	13.5	8.4	9.9	13.6
Total Group A ...	29.2	41.2	28.7	32.2	42.4	31.3
Group B.						
<i>Industries which have expanded nationally around the average.</i>						
Food, Drink and Tobacco ...	3.2	3.7	49.8	3.8	4.0	43.1
Metal Goods (not otherwise specified)	1.4	1.8	32.4	2.2	2.3	35.9
Metal Manufacture	5.8	5.8	7.8	2.5	2.6	11.9
Total Group B ...	10.4	11.3	25.6	8.5	8.9	32.1
Group C.						
<i>Industries which have expanded nationally below the average (or contracted).</i>						
Agriculture, etc.	2.1	1.4	15.6	3.9	3.6	13.7
Mining and Quarrying	19.0	13.6	4.5	6.6	5.8	8.5
Other Manufacturing Industries ...	3.8	4.1	37.1	6.7	6.0	34.0
Building and Contracting	8.5	6.4	3.6	7.3	6.4	3.5
Miscellaneous Services	6.8	5.6	74.0	9.7	7.8	72.8
Clothing	1.9	2.6	82.3	4.1	3.9	71.2
Distributive Trades	14.2	10.3	57.0	14.6	10.6	49.9
Textiles	4.1	3.5	63.6	6.4	4.6	58.1
Total Group C ...	60.4	47.5	83.1	59.3	48.7	27.8
Total for all groups ..	100	100	30.3	100	100	34.3

¹Excluding the Merseyside and North Lancashire Development Areas.

Table V shows the increased diversity which these movements have brought to the Development Areas. For example, whilst in 1939 60.4% of the total labour force in these regions was concentrated within those industrial groups which were expanding nationally the least rapidly (or contracting),¹ by 1953 this figure had been reduced to 47.8%—the biggest single reduction being in mining and quarrying. On the other hand, the more rapidly growing industries have increased their share from 29.2% to 41.2% of the total employment and here, the engineering and electrical products trades and public administration services have gained the most. Certainly, from the aspect of female employment, the decline in the relative importance of the distributive and textiles trades has been more than amply compensated by the new opportunities given in the engineering and electrical products, clothing and professional services industries. Of the *increase* in the female labour force between 1939 and 1953, these three groups alone accounted for some 60%.

Such movements as these seem to have been fairly evenly spread throughout the various Development Areas, though, as one might expect, South Wales, W. Cumberland and Wrexham have gained relative to other regions, whilst Scotland, which before the war had the textile industry in addition to the traditional trio of coal-mining, shipbuilding and engineering, appears to have gained the least.² Such overall statistics, however, hardly tell the full story. For, already a certain degree of industrial specialisation is taking place in the various Development Areas, *within* the newer trades. Scotland, has, for example, attracted by far the larger share of light precision engineering, *e.g.* office machinery, electronics and aircraft (and

¹As measured by 1939/1953 growth standards. In fact immediately before the war, the *relative* rate of expansion in certain industries would have been slightly different. For example, metal manufacturing shown in Group B would have been classified in Group C, and clothing and the distributive trades shown in Group C, would have been classified in Group B.

²For example, in 1939, employment in Group A (the most rapidly expanding industries) accounted for 21.2% of the total labour force; in 1953 it accounted for 38.5%. Corresponding figures for the other Development Areas:—Scottish 38.0%; 47.3%, North-Eastern 36.4%; 46.3%, West Cumberland 18.7%; 34.3%, Wrexham 13.1%; 31.8%, and South Lancashire 22.1%; 30.2%.

aircraft component) manufacturing : this in no small way is due to the fact that this region has gained by far the largest proportion (probably 75%) of the post-war established American manufacturing subsidiaries, which have been predominantly engineering in character. On the other hand, South Wales has benefited, relative to the other Development Areas, in refined petroleum, rayon and nylon, and clothing production, whilst the North-Eastern region has attracted more than its average share of the plastics and electrical equipment industries. "This trend might well be expected to continue in the future, as new "pockets" of specialised skills are built up.

Finally, from a national view-point, recent movements have tended to lessen the regional concentration of industry. For example, the Development Areas' share of total national employment in the mining and quarrying, building and contracting, and metal manufacturing industries has contracted from 30.3% in 1939 to 25.3% in 1953, whilst for the remaining industrial groups there has been a corresponding expansion. More particularly, the electrical goods, vehicles and clothing trades have increased their share from 5.3% to 9.7%.

All these movements tend to confirm the fact that in at least four major respects a considerable element of stability and flexibility—both economic and social—has been injected into the Development Areas since 1939 :—

- (1) The structure of industry has become more diversified—both as regards the techniques and methods of production utilised on the one hand, and the direction and type of markets served on the other. This latter trend has been particularly noticeable in the case of export demands.
- (2) A growing percentage of employment is now concentrated in those fields of activity where, as far as one can judge, long-run demand is increasing.
- (3) Many new employment opportunities for women have been created—in the main complementary in character to those offered to male workers—thereby furthering the stability of the family income.

- (4) There is now less dependence on the production of those types of capital goods trades which are particularly vulnerable in times of trade depression. Moreover, the percentage of output sent overseas has fallen since pre-war days, thereby affording any counter-cyclical measures which might be adopted, a better chance of success.

Resulting from these trends, the increased mobility of labour which has followed, and the general period of national prosperity enjoyed since 1945, unemployment in the Development Areas has fallen markedly. Table VI shows that in 1937 the numbers of insured workers unemployed in these regions was 18%, compared with 10% for the country as a whole.

TABLE VI
PERCENTAGE OF INSURED PERSONS REGISTERED AS UNEMPLOYED IN
DEVELOPMENT AREAS AND GREAT BRITAIN, 1937/53

	Male			Female			Total		
	1937	1948	1953	1937	1948	1953	1937	1948	1953
North Eastern ...	16.0	3.2	1.8	8.0	2.9	3.5	15.0	3.1	2.5
South Wales ...	22.0	5.1	2.1	12.0	7.8	3.1	21.0	5.7	2.3
Scottish ...	19.0	4.0	2.6	14.0	2.9	3.0	18.0	3.7	2.8
West Cumberland	28.0	3.0	2.0	10.0	2.2	1.7	26.0	2.8	1.9
Wrexham ...	19.0	3.8	1.1	10.0	11.8	3.1	18.0	5.4	1.3
South Lancashire ...	21.0	2.9	1.6	12.0	2.6	3.6	19.0	2.8	2.2
Merseyside ...	—	—	3.6	—	—	3.0	—	—	3.4
All Development Areas ...	19.0	3.9	2.4	12.0	3.8	3.0	18.0	3.9	2.6
Great Britain ...	11.0	1.9	1.4	7.0	1.2	1.5	10.0	1.7	1.4

Source :—Figures for 1937 (rounded to nearest whole number) taken from the Distribution of Industry White Paper, Cmd. No. 7540, 1948. 1948 and 1953 figures are derived from Ministry of Labour Statistics.

By 1948, this percentage had been reduced to 3·9% compared with 1·7% for the country as a whole, and in 1953 further so to 2·6%, compared with the national figure of 1·4%. With the improvement in the absolute position has also come a slight improvement in the relative position of the Development Areas, particularly in the case of certain regions, such as the North-East, Wrexham and South Lancashire Development Areas. More especially, in the last two or three years the male unemployment position has greatly improved. Partly this is because more manufacturing—and less pure assembling—is now being carried out by firms of post-war origin; partly because the defence contracts placed in certain industries, *e.g.* electronics aircraft, etc., are demanding highly-skilled male workers—which, in some cases, are replacing previously employed female labour. The difference which still remains in regional unemployment rates is mostly explained by the higher proportion of long period unemployment, from which the Development Areas suffer as compared with the country as a whole. For example, in 1953, 37% of the unemployed males in the Development Areas had been out of work for more than 26 weeks—as compared with the national average of 29%. In South Wales, the figure was as high as 44%, and in South Lancashire 47%. The difference is even more marked when one looks at the male unemployment figures for those over the age of 40. In the Development Areas 28% of all the males unemployed in this category had been out of work for over 26 weeks, as compared with 22% for the country as a whole. In South Wales, the figure was 39%, and in the Wrexham Development Area nearly 50%. Certainly, the position has much improved since before the war, but there are still many thousands of unemployables—this in spite of the Board of Trade Remploy factories and incentives offered, for example, by the Grenfell Scheme, to employers to engage disabled labour. Indeed it does not seem likely that the unemployment rates, *e.g.* in such areas as the South Wales valleys, will ever fall to the national average. For, in regions such as these, the geographical mobility of labour is very limited by the topography of the area, which at the same time prevents factory sites being erected near villages whose sole *raison d'être* has been built up around the surrounding coal pits.

Such factors as these ¹ substantially explain the relative differences in unemployment rates between the Development Areas and Great Britain, and the fact that although these regions have only 16·8% of the total labour force, their proportion of total numbers unemployed is 32%.

III.

The above figures in the main substantiate the arguments put forward by Professor Sykes in his article, though they suggest that perhaps further emphasis ought to be placed on the role of the newer industries. The figures have been presented purely to show the changes as they have affected the Development Areas : no attempt has been made to take into consideration the effects which these movements have had on the country's economy as a whole. From the data given, one cannot doubt for a moment, that to *the Development Areas* the gain has been very much on the positive side. To the economic advantages already cited must be added the considerable benefits which have also been derived from the increased utilisation of existing capital—both private and social.² This has been brought about not only by the Government's industrial location policy, and the high cost of manufacturing in London and the Midlands, but by the movement of labour—particularly male labour—away from the Development Areas to the South and East since 1945 ; though this latter factor may well be of dubious advantage in later years as the ratio of working to dependant population becomes less favourable.

To *the newly-established firms* in these areas, for all intents and purposes, it does not seem that their production costs are significantly higher than they would have been had they been given the opportunity of producing in the areas of their first

¹ . . . and others more particular to the area concerned. For example, the small, though compact, Wrexham Development Area, was almost entirely reliant on the coal-mining industry for its economic livelihood before the war. To-day, though more diversified, it has a relatively higher proportion of disabled, or partly-disabled, miners looking for work, and their position is made especially difficult by the policy adopted by one large "new" employer of labour, only to recruit young men who have passed a medical fitness test.

² Again, most noticeably in the distributive trades and public utility services.

choice.¹ Balanced against the dis-economies of increased transport and communication costs, lower labour productivity, lack of skilled operatives and being far removed from the main centres of research and development, have been the economies of a plentiful supply of unskilled labour at minimum union rates (no "scarcity premium" has needed to be paid), first-class factory accommodation at below average rents and cheaper service costs. Naturally enough, one finds that the valuation of these variables differs according to the Development Area and industry concerned, but generally speaking it has been found that to the newer industries in question (which in the main have a moderate to low coefficient of localisation²) the significance of location costs *per se* seems to be much less than for example it is to the older staple trades. Transport costs, both inwards and outwards, are usually relatively unimportant, and do not greatly vary as between the different geographical regions, due to the diversity of sources of supply on the one hand and the widespread character of consumer markets on the other. Labour costs as a percentage of total costs, also tend to be less significant in many of the newer trades: yet, against this must be set the growing importance of the skilled labour content which, together with the "agglomerative" economies of being in close proximity to the main research and technical developments within the industry concerned, are exerting the major locational pull in this era of rapidly advancing technology. Such, for example, was found to be the main drawback faced by radio and television firms producing in Development Areas,³ though here the importance of the *type of operation* and *character of the plant* operated, as factors influencing the success—or otherwise—of the Development Area enterprise, was also stressed. Whether, for example, the factory is the sole factory, or whether it is a branch of a parent

¹See, for example, the references quoted by Sykes, *op. cit.*, in his footnote 2 on p. 6. Also Hague & Dunning, "Costs in Alternative Locations: the Radio Industry." *Review of Economic Studies*, 1954/55. Vol. XXII, No. 59.

²See, for example, those cited by J. Sykes in his "Some Results of the Distribution of Industry Act, 1945." *Manchester School of Economic and Social Studies*. Vol. XVII. No. 1. January, 1949.

³See Hague & Dunning, *op. cit.*

concern closely situated to the centre of research and development work: whether—assuming it is a branch—the plant is autonomous in its operation, or whether it is administered centrally with the minimum of local management: whether the branch is merely duplicating the products of its parent concern, or whether it is a separate entity carrying on a line of business more suitable to the skills of the areas concerned:—¹ such questions as these are perhaps equally vital as the nature of the industry itself to the success of the Development Area plant, and whether or not its costs tend to be higher or lower than they might be elsewhere. Most certainly it appears that if the firms in question had been established in the “traditional” location of the industries concerned, wage costs would have been pushed up above the level already prevailing, and this no doubt would have been to the disadvantage, not only of the firms, but of the economies concerned. Probably, few of the firms who were “persuaded” to produce in the Development Areas in fact seriously worked out the costs of locating their plants in the areas of their first choice, but it does seem that if one is to study the “opportunity costs” of alternative factory locations, it is essentially factories in areas other than in the London area, and the Midlands, which ought to be considered; and here there is no real reason to suppose that the production costs would in fact have been greatly different. The main problem which has had to be faced by the firms in the Development Areas—the lack of suitably trained skilled labour—would probably have been met with in all other areas as well. In any event, it is still too early to judge whether this is a permanent disadvantage or not. And *to the country as a whole* this is perhaps the most important question:—whether, in fact, the substantial social gains,² from which the Development Areas

¹The importance of considerations such as these can be gauged from the following example:—In the 1950/51 radio industry recession, the radio firms operating in the South Wales Development Area suffered cuts in their labour force far more than in the other Development Areas. This was primarily because the branch plants in this former region were simply “duplicating” the products of their parent concerns, unlike those, *e.g.* in the Scottish Development Area, which were carrying on separate lines of business to their London plants.

²Sec, for instance, J. Sykes—“Social Aspects of the Control of Industrial Location.” *The Sociological Review*. Vol. II, No. 2. December, 1954, pages 229/233.

have benefited—most certainly more than would have been gained by other areas in the country—have outweighed the differences in private costs as between firms established in the Development Areas, and those which would have been borne had they been established in other areas outside London and the Midlands. Always remembering that quite apart from any “newer” industrial expansions, the Development Areas will always have a vital role to play in the economy of the basic industries, the evidence here, limited though it is, is that such a gain from the national view-point, both long and short term, has been predominantly on the positive side,¹

JOHN H. DUNNING.

University of Southampton.

¹A contrasting argument is put forward by A. C. Hobson in his article, “The Great Industrial Belt,” *Economic Journal*, September, 1951. Also see his rejoinder to Professor Sykes’ comment in the Notes and Memoranda section of the *Economic Journal*, June, 1952.

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Wages: Industry Rates, Workplace Rates and the Wage-Drift¹

I. INTRODUCTION : WAGE-ADVANCES.

Discussion of British wage-movements in the period of continuous high employment since 1939 is usually bedevilled by a discrepancy between their two most general indices—those of “Rates” and of “Earnings.” So it will be as well to start with a demarcation.

Eliminating the effect of changes in the age-and-sex make-up of the labour force and in its industrial distribution, average weekly earnings in our “Principal Industries” increased by just about 200 per cent. from October, 1938 to October, 1954. Average working hours were approximately the same at the two dates, so this also represents the rise in (what is the best available common measure of the price of labour) average hourly earnings. To this 200 per cent. advance, the major contributant was those increases in wage-rates arranged by what the British call “national” and the Americans, more aptly, call “industry” bargaining. Standard “industry” wage rates exist for nearly all wage-earners, and are those on which our current official Index of (weekly) Rates of Wages is mainly based. Including adjustments to hourly rates effected by reductions in the nominal working week, “industry” increases added 160 per cent. to wage-rates by October, 1954. The remainder of the increase in earnings was due to several things, among which an excess of the wage-rates actually paid by employers over those laid down in “industry” agreements was certainly important.²

¹Some of this essay's material was first presented in a paper, “Social Determinants of Wages” to the 1955 meeting of the British Association for the Advancement of Science. The help of officers of government departments, the T.U.C. and individual unions, employers' organisations and firms should be acknowledged—as should their non-responsibility for the result.

²In making these estimates, and certain later calculations, a method similar to that of Mr. F. A. Penrice, “Earnings and Wage-Rates since 1938” (*Bull., L.C.E.S.*, Sept., 1952) has been used to estimate the effect of inter-industry transfers and changed sex-balance. It produces no very different results for his dates, of course.

It is with this second contributant to wage-increases that this paper will mainly attempt to deal. Although changes in "industry" rates account for four-fifths of the average wage-advance since 1938, their main features are sufficiently well-known for the first section of this study to cover their trend in a summary fashion and without obvious refinements and qualifications. The last sections, however, will consider the relation between the two contributants to wage-increases, and some conclusions that follow from it.

II. "INDUSTRY" RATES : EQUAL INCREASES.

The major tendency of "industry" wage-rates since 1938 may be summarised by a generalisation. They conform to a Rule of Equal Increases. A familiar illustration is, of course, the propensity (until quite recently) of unions to demand, and of employers to concede, equal cash increases for differently-rated men under the same "industry" agreement. The Rule has, however, a much wider application.

Table I analyses the increase of weekly minima ordered, for men, by statutory wage-boards. There are some sixty of these bodies, which operate in as many classified trades, the common quality of which is only that at some time union or employers' organisation has been inadequate to secure or enforce collective agreements : they include manufacturing, transport, distributive and service industries employing 2 or 3 million workers. It will be seen that, both over the whole period from mid-1939 to mid-1954 and year-by-year, the differing sectional and industrial rates were raised by almost identical cash amounts.

One may compare the more complex field of collective agreements. The Ministry of Labour has kindly traced a representative selection of weekly wage-rates over the period.¹ These are for workers of different occupations and districts in

¹These rates were requested to verify a trend visible in certain major agreements by an impartially-selected sample. They include 52 men's and 21 women's rates, with their district variation, but do not include all those first considered by the writer, the movement of which could be more easily ascertained. They yield, however, an index which moves (allowing for their non-inclusion of juveniles) closely with the official index of weekly wage-rates.

TABLE I
MEN'S STATUTORY MINIMUM WEEKLY RATES

As at 1st July	Lower Quartile	Median	Upper Quartile	
	s. d.	s. d.	s. d.	
1939	46 0	49 9	54 0	Quartile Rates.
1940	4 0	3 3	3 0	Cumulative annual Increase.
1941	8 0	9 8	8 0	
1942	13 0	12 3	13 0	
1943	16 0	16 10	15 0	
1944	20 0	19 3	18 0	
1945	22 0	22 3	20 5	
1946	26 0	26 11	25 6	
1947	32 10	32 8	32 0	
1948	36 6	36 3	35 0	
1949	40 2	40 1	39 6	
1950	NA	NA	NA	
1951	NA	NA	NA	
1952	53 0	53 9	54 0	
1953	61 3	61 3	61 0	
1954	66 6	66 9	66 0	
1939-54	% 145	% 134	% 122	Total Percentage Increase

Source : T.U.C. Wages Councils Dept., monthly analysis of minimum weekly rates fixed by statutory wage-boards. Current coverage 75 men's and 88 women's rates. The analysis does not cover catering and agriculture, but agriculture is included in the "Representative Rates" referred to later.

16 major industries, with about seven million employees. They include a few legal minima but are mainly fixed by normal "industry" bargaining. Analysed in the same way as the Statutory Rates, these "Representative Rates" show—up

to the "wage-restraint" of 1949/50—the same trend, although their range is at each date very much wider :

	Lower Quartile	Median	Upper Quartile
Cash Increase in Men's Representative Rates, mid-1939/49	42s. 6d.	42s. 10½d.	42s. 7d.

And the two or three shillings by which these advances exceeded those in Statutory Rates (see Table I) seems mainly accounted for by a secondary tendency of "industry" agreements—this, a known historical one—to level up lower-paid districts. Since these agreements usually amalgamated former local bargains, district differentials were once much more common under them than under the orders of statutory boards, which were required to start by devising a "floor" for their trade.

The date here—1949—is important. After the collapse of formal "wage-restraint," men's rates under collective agreements and arbitration awards generally continued to advance by equal amounts, but in percentage terms :

	Lower Quartile	Median	Upper Quartile
% Increase in Men's Representative Rates,* mid-1949/1954	33	34	34

*Excluding rates under statutory orders.

Statutory wage-boards departed from this dominant pattern by retaining (see Table I) a preference for uniform cash advances. But those conceded were equal to the lower cash increases (those to labourers in worse-paid industries) under collective agreements. The resultant sharp relative decline in higher statutory rates accounts for the most marked of the few significant changes in the *hierarchy* of "industry" rates recorded by these analyses.¹ And the relative superiority of wage-rates

¹The Statutory Rates analysis includes few that would apply to conventionally-demarcated skills, but from 1949 to 1954 legal skilled rates in the Representative selection rose by 28% which was also the Upper Quartile increase of the Statutory Rates selection. A ranking of the Representative Rates gives the following correlation co-efficients :—

1939	ranks with	1946	: 0.84
1939	"	"	1949 : 0.83
1939	"	"	1954 : 0.73

If the statutory minima are taken out, however, the correlation of 1939 with 1954 ranks becomes : 0.81. Otherwise (as the similarity of these co-efficients suggests) the main disturbing influence is local up-grading, which was most pronounced in the war period. (I am obliged for Mr. J. Johnston's advice in making these calculations).

in more-unionised trades was incidentally restored to near its pre-war level :

	1939	1949	1954
Men's Median Statutory Rate as a % of Men's Median Representative Rate	87	90	87

But, at least, as concerns the general labour unions that form the substantial link between the two clusters, the principle of Equal Increases was not formally breached.

It may thus be important that Equal Increases can take alternative forms. And in one major case a compromise has emerged. In 1939, it appears that women's "industry" rates averaged just 60 per cent. of those of men in unskilled and semi-skilled occupations, to which women are very largely restricted. Since then, the median cash rise in women's Representative Rates has been just slightly over 80 per cent. of the comparable men's increase at each date for which this analysis is available—and this is also true of the Statutory Rates for the whole period. Women's advance thus almost exactly represents the mid-point between an equal percentage and an equal cash increase with men. Variation from this "80 per cent." norm has, moreover, progressively diminished so that—by contrast to the preceding case of certain lower-paid men—women have continued relatively to gain. And what is apparently crystallising is a new conventional sex margin.¹

However, both these variants—men under statutory wage-orders and women in general—concern less-unionised wage-earners. In the more-organised occupations, it seems clear that a simple pattern of Equal Increases has been mainly preferred. And with this the insistence of employers' organisations has had, apparently, as much to do as the demands of

¹In 1955, the distributive and chemical workers' unions each adopted wage-programmes specifying 80% as the *proper* relation of women's minimum wages to men's.

trade unions.¹ But for the latter, at least, the choice between the simple forms has itself become one of sufficient difficulty—a point to which this study's conclusion will return.

III. "WORKPLACE" WAGE-RATES : UNEQUAL VARIATION.

The orderly movement of "industry" wage-rates apparently disappears when one considers the wages actually paid by employers. Such broad changes as those in skill- and sex-differentials are on the whole reflected by average earnings figures, though generally in a modified way. Inter-industry relatives, however, are in several cases altered. And when one descends to individual cases, the first impression is one of widespread anomaly. Draughtsmen, tool-room engineers, and patternmakers at the Pressed Steel Co. struck in 1955 because they were earning less than semi-skilled production operatives, to take a case very typical of the engineering industry. In recent disputes on the N.W. Region, it was reported that permanent-way gangs employed by contractors were receiving up to twice the wage of the British Railways' own men for identical work. Such incidents are very common in contemporary employment. It is not easy to attribute them entirely to the local operation of the labour market.

Analysis of this problem is considerably handicapped by lack of detailed data. We have, for instance, no sectional breakdown of the official Index of Rates of Wages so that average rates and earnings in particular industries can be compared over the whole field. Nevertheless an appreciation of the main factors seems possible. First one must estimate the extent of variation from "industry" rates. Since such variations are nearly all arranged by collective or individual bargaining at

¹The Newspaper Proprietors' Association, to the Court of Enquiry into the press mechanics' strike of April, 1955, declared (Cmd. 9439) that it "... in accordance with past practice, had made an estimate of the total amount it was prepared to make available for a wage increase," and that it was its policy "... not to disturb relativities within the wage-structure and to refuse to concede to any Union better terms than those offered to all the others." In this industry, separate occupational agreements (involving 14 craft and inter-industry unions) are still the rule. As *between* industries, Equal Increases have on several occasions been awarded by arbitrators or offered by employers' associations despite a specific rider that they were without economic justification.

particular establishments, they may be called "workplace" margins, and the result of combining them with the relevant "industry" rate the "workplace" wage-rate.

It can be deduced from reported 1938 earnings that "workplace" rates did not, on the average, vary greatly from the "industry" rates then in force.¹ It has already been reckoned that one-fifth of the increase in average earnings to late 1954 is not accounted for by "industry" increases in wage-rates, or by changes in the actual working hours, age-and-sex composition, or industrial distribution of the labour force. It would follow that at the last date average "workplace" wage-rates exceeded those laid down in "industry" agreements by up to 15 per cent. "Up to," because a number of things which have also increased average earnings cannot be estimated. Of these, skill upgradings are probably most important, though it is often difficult to distinguish genuine changes of function from concealed wage-increases. They have certainly occurred on a sizeable scale : in 1949, for instance, only 9½ per cent. of men born from 1920 to 1929 were unskilled labourers, compared ² with 18 per cent. of men born before 1890. The effect on average pay, however, is likely to be moderate : Mr. Penrice's guess of about 2 per cent. as the resultant addition between 1938 and 1951 is probably as good as any.³ Another factor is increased shift-work : the only general census so far made

¹Reported industrial earnings represent the product of "workplace" wage-rates for the current hours worked by, and given the current age-and-sex composition and output of, the industrial labour force, as well as its current distribution between differently-rated industries, occupations and areas. Average "industry" rates were here assumed to approximate to the media of the Representative Rates already used. A similar comparison for 1954 also confirms the subsequent estimate of up to 15% as the average excess of "workplace" over "industry" rates in October, 1954. Some major industries—principally coal-mining, agriculture, and several transport services—are, of course, not included in the Ministry of Labour's earnings census. For the "Principal Industries" to which the latter relates, the published index of wage-rates does not differ greatly from the more comprehensive Index of Rates of Wages, and it does not seem likely that the inclusion of such industries would much affect the average "margin."

²Glass & Hall, *Intergeneration Changes in Status*, Table 9 (in *Social Mobility in Great Britain*, D. V. Glass, Ed.).

³"Earnings and Wage-Rates since 1938," *op. cit.*

showed¹ about 12 per cent. of manufacturing operatives on shifts in 1954: on this, shift margins might now make up 2 or 3 per cent. of average earnings, but we have no earlier comparison. Then there is the movement of workers to better-paid areas; but such geographical shifts are not likely to be more important than inter-industry transfers which, for the whole period, add only about 1 per cent. to average earnings.² All told, the total addition from these things might not unreasonably be put at about 5 per cent. since 1938, leaving some 10 per cent. as the average "workplace" margin in late 1954.

The important things, however, are that this excess has increased (except in two brief interludes to be later analysed) throughout the period, and that it is most unevenly distributed between and within occupations and industries. The latter is shown by the fact of *downward* variation from "industry" rates. It seems commonly thought that general labour shortage is alone sufficient to ensure that the wages paid by employers shall exceed those prescribed by "industry" agreements and awards. However, Table II analyses the reports of official inspectors on the extent of discovered underpayment of statutory minima. This should not be given a superficial interpretation, because the scope of legal wage-regulation has been greatly extended over the period, while one or two now well-organised trades have withdrawn from the system: the intensity of its enforcement has also varied (some notes on the table are included as an Appendix). But in trades where the system has operated continuously, the proportion of workers underpaid appears at least comparable with that in pre-war reports, while the average amount of arrears found legally owing to them seems to have risen roughly in proportion to wages. Where a new wage-board has been set up (as in road haulage) or the system has been reinforced (as in agriculture), underpayment apparently declined over the first few years but

¹Ministry of Labour Gazette, Oct., 1954. "Authorisations" to employ women and young persons on shifts also shows a large post-war increase, but the number of workers affected is unknown.

²The year-by-year effect is greater than this would suggest, but movements at different times offset one another. Mr. Penrice has recently extended his estimate (*Bull., L.C.E.S.*, Dec., 1955) and its detail is confirmed by the writer's.

TABLE II
UNDERPAYMENT OF STATUTORY MINIMA

	General Trade Boards (now Wages Councils)		Road Haulage (Operative from 1940)		Catering Boards (Operative from 1946)		Agriculture (National Wage-fixing 1940)		ALL SECTORS	
	Workers Under-paid %	Av. Ar-rears £ s.	Workers Under-paid %	Av. Ar-rears £ s.	Workers Under-paid %	Av. Ar-rears £ s.	Workers Under-paid %	Av. Ar-rears £ s.	Workers Under-paid %	Av. Ar-rears £ s.
1938...	2.9	3 4	—	—	—	—	11.2	7 19	3.3	3 18
1939...	3.3	3 7	—	—	—	—	16.1	6 10	3.9	3 18
1940...	6.1	2 17	40.0	3 14	—	—	15.6	5 15	8.0	3 8
1941	5.3	4 8	19.2	7 7	—	—	19.8	7 9	8.2	5 12
1942...	4.6	5 2	18.8	9 10	—	—	16.8	11 1	7.1	7 8
1943...	5.1	3 14	17.5	7 13	—	—	9.6	12 17	6.8	5 19
1944...	3.3	5 15	15.1	7 13	—	—	9.4	15 17	5.0	8 1
1945...	3.2	4 6	7.8	7 8	—	—	12.7	16 6	4.4	7 13
1946...	3.9	3 8	7.6	6 1	8.5	2 8	4.8	17 2	5.0	5 1
1947...	6.5	2 14	16.3	5 12	8.1	3 3	5.2	19 7	7.7	4 1
1948...	7.8	4 4	22.4	6 14	11.7	4 7	5.1	19 13	10.6	5 5
1949...	5.5	4 0	17.7	6 17	11.7	7 6	2.9	20 11	8.6	7 1
1950...	6.5	5 5	14.6	8 5	10.7	9 7	2.9	19 5	7.2	7 4
1951...	6.3	6 18	14.1	7 14	9.6	7 16	2.9	19 17	6.7	7 16
1952...	7.0	6 18	12.9	7 4	10.8	6 18	2.6	21 4	7.5	7 9
1953...	7.0	7 2	12.7	7 9	10.2	6 12	2.7	18 18	7.4	7 7
1954...	6.0	7 17	9.9	7 5	9.3	7 2	2.8	16 12	6.6	8 0

For Notes on this Table see Appendix A

then settled down to a steady ratio. There is little to indicate the extent of underpayment on agreed or arbitrated wage-rates beyond the large proportion (about a third) of Industrial Disputes or National Arbitration tribunal awards made on

union complaints of particular employers' non-observance of agreed conditions (which have since 1940 been given a moderate legal support under this procedure). Such underpayment is almost certainly not very extensive, but there is clearly some scope for it.

It also follows that some part of the difference between "workplace" and "industry" wage-rate movements must be attributed to the extension of statutory regulation or of union organisation. Thus the "workplace" rates of lorry-drivers appear to have risen about 25 per cent. faster than "industry" rates in road haulage.¹ And since this difference mostly developed in the war period, it seems reasonable partly to associate it with the very marked effect (see Table II) of legal regulation and enforcement in that trade.

In several trades there are, of course, still groups for which no "industry" or even district rate exists. The outstanding case is probably that of the numerous semi-skilled engineering operatives, who were only formally demarcated in this industry's general wage-increases in 1954, and for whom no specific basic rates exist outside the firm. This may have influenced the movement of "workplace" rates in firms where such operatives are particularly numerous. But the more frequent case probably concerns small groups of skilled specialists such as are to be found in the textile trades: these may have benefited disproportionately from firm-by-firm bargaining, but are not likely to much affect the average "workplace" margin.

Otherwise, this margin seems to have two main components. First, straightforward additions to "industry" rates by individual employers. The extent of these "plus-payments" is very much affected by the latter's organisation. "Federated" firms employ nearly as many workers as the trade unions have members—though the two

¹For rates referred to in this section, a rough index of hourly "industry" rates has been made from the Representative or Statutory Rates or official publications: the L.C.E.S. Index weekly rates (appropriately adjusted to hours) have also been used as a check or supplement. Average hourly earnings have been taken to indicate "workplace" rates. There is thus a considerable margin of error: but it has been preferred to do this rather than draw on the several private studies also referred to (and which do not seem to give inconsistent results, anyway) so that the calculation should at least relate to the same period and be of the same kind in each case.

constituencies by no means coincide. Employers' federations generally impose some restraint on "plus-payments": the British Employers' Confederation itself has specifically urged¹ its member associations to "honour national wage-agreements." But their coverage and discipline varies considerably between industries, as does the effect of those things on wage-rates. Broadly—and in private employment—it seems least at extremes. Very large firms, on the one hand, often appear impatient of such restraints. I.C.I. once left the chemical employers' federation on the question of its power to pay rates above its associates, and its present membership appears conditional on the retention of separate bargaining arrangements. Several of the big motor-vehicle manufacturers are not "federated"; since the war, average rates in their factories appear to have run at about one-and-a-half times "workplace" rates in engineering generally.² On the other hand, small employers in competitive, unstable trades have little habit of mutual discipline (it was of course, such trades for which the system of legal wage-regulation was first devised). Thus in the garment trades, "workplace" wage-rates appear to have risen about 10 per cent. faster than statutory minima by the end of the war; the difference stayed around that figure to 1950, but thereafter declined to about 6 or 7 per cent. (implying it remained roughly constant in cash).

In between these extremes come trades where employers, though numerous, are usually long-established. These often have an acquired tradition of mutual loyalty and strong employers' associations. In the cotton trades, for instance, the masters' associations exercise a considerable restraint over their members, who control the bulk of the industry's capacity. The complexity of the industry's wage-system permits a certain tolerance in application, as does the absence of "industry" agreements for certain classes of work. But large concerns

¹The President of the B.E.C., in a press statement after the B.E.C. conference of some 60 employers' federations in October, 1955: "We are asking firms which make unfair bids for labour by paying more than the national rate to stick to national agreements." Mr. H. A. Clegg gives a general account of employers' associations' attitudes on this matter in *The System of Industrial Relations in Great Britain* (Clegg and Flanders, ed.).

²Private Sources.

have been compelled to resign from an association because they wished to exceed these limits by open "plus-payments," and even union officers will refer to such margins as "malpractices." In the building trade, the writer is informed that local masters' federations not merely have the power to fine members for such offences, but have on recent occasion done so. This industry, and two others, seem particularly affected by employers' solidarity. In building, average "workplace" rates seem to have risen only about 3 or 4 per cent. faster than "industry" rates since 1938; the excess apparently diminished in the interval between the lapsing of a war-time "incentive" bonus agreement and its (modified) reinstatement. In printing and in agriculture, the movements of "workplace" and "industry" rates have closely coincided over the whole period.

This does not mean, of course, that there are no "workplace" margins in such trades—"house" and "merit rates" are an established feature of printing employment—but that they are probably not, on the average, large and that they move in fairly strict relation to "industry" rates. They often include a customary element: in one Lancashire district, for instance, there is an established "understanding" between master-builders that they will pay up to 3d. an hour above the standard craft rate and not more. The agricultural case is quite well documented, the writer's estimate that there is no significant difference between the proportionate increase of the legal minima since 1938 and that of actual wage-rates being confirmed, up to 1950 at least, by an official enquiry.¹ Nearly half of all farm-workers currently receive only the minimum rates² and the *average* excess (after due overtime and short-time payments) on weekly minima seems only to amount to a few shillings, being largely accounted by differentials for foremen, lorry-drivers, and other specialised workers (for whom the wage-board orders make few specific provisions).³ The case is also

¹Some results of the Ministry of Agriculture's very detailed private survey of farm wages have been annotated by Messrs. Palca and Davis "Earnings and Conditions of Employment in Agriculture" (*J.R.S.S., Series A, Part I, 1951*).

²The General Secretary of the N.U.A.W., Mr. Collison, in *Financial Times* supplement "Agriculture," Jan., 1956: "Statistics show that, etc. . . .," presumably referring to the official survey.

³See Palca and Davis, *op. cit.*

particularly interesting, because there is some evidence of a mal-distribution of labour between farms, such that it would pay larger farmers to bid labour away from smaller,¹ as well as a marked and steady loss of labour to other trades. Many farmers, however, appear to have treated the legal minima as maxima from the first (they were introduced in 1917/18) ; and one pressure in this direction may have been the system of price-guarantees with which *national* minimum wages in agriculture have been, both in 1917/21 and since 1940, closely associated. One student, at least, has suggested a demonstrated inability to pay high wages to have been an argument in the farmers' negotiations with the government.²

Differences in the size and stability of firms apparently affect the distribution of "plus-payments" within industries as well as between them. One recent survey of builders' wages, for instance, classified operatives into three groups.³ At this time craftsmen on their basic rate would earn (with summer overtime) about £10 a week. Up to a fifth of operatives, however, were on "incentive bonus" schemes, which were estimated to add about £2 per week to craftsmen's earnings : these were mainly employed by big contractors. A small proportion (about 5 per cent.) of operatives worked on the "labour only" system : this is virtually a revival of nineteenth-century labour sub-contracting, in which a "gang-master," without plant of his own, contracts to perform a specific task at an agreed price. The system has been opposed by the unions because of the difficulty of controlling (sometimes, of even tracing) such employers, but was reported to yield earnings to their hired workers averaging £20 a week "in good weather." The other three-fourths of the builders were said to be on or close to the

¹Colin Clark and J. O. Jones, "Production Functions . . . of Land and Labour in English Agriculture," *J. Agric. Econ.*, XI, 2.

²E. Mejer, *Agricultural Labour in England and Wales*.

³*Manchester Guardian*, 8th Oct., 1955. Allowing for overtime, the average "workplace" margin on its figures closely corresponds to the writer's estimate.

basic rates, and these were mainly employed by smaller regular master-builders—or by local authorities.¹

This introduces another category of employers. "Plus-payments" appear negligible in most non-private employments. In centralised public monopolies like railways, of course, wages paid are almost absolutely determined by a single central agreement. But "workplace" margins are also small in decentralised public services, the separate units of which are often strongly federated for bargaining. Local authority employees, and workers in road passenger transport, show little notable variation between "workplace" and "industry" rates over the period. In 1954 the Federation of Municipal Transport Employers expelled the Birmingham authority for increasing bus crews' wage-rates to counteract high local manufacturing wages; in 1955 it refused Manchester's request (made on similar grounds) for freedom to pay above the "industry" agreement although the request was supported by Coventry and Leicester. And when the combined pressure of embarrassed major authorities and "unofficial" strikes in certain areas finally induced the road passenger Joint Industrial Council to agree (in early 1956) that special local rates might be paid where staff was particularly hard to get, it did so only with the proviso that such rates must be subject to its own specific approval in each case.² In these matters, the discipline of public authorities is greater than that of private employers in general: but their motive is not dissimilar. In Salford, a proposal to pay "incentives" to attract another scarce grade of municipal staff was rejected on the ground that the City "couldn't afford to compete with richer local authorities," and that other Councils were already demanding "protection"

¹The recent London print dispute suggests a rather similar situation within a trade seeming generally disciplined. The relatively high "house" and "merit rates" the Enquiry (Cmd. 9717) revealed for compositors may be associated with the concentration in London of the national newspaper presses, the proprietors of which have an association independent of the general master-printers and not even belonging to the printing J.I.C.?

²At going to press, the employers' side has rejected the first application (from Manchester to pay a 2d. per hr. supplement) against the unions' support of it. It should thus be referred to the Industrial Court, where the applicant (as itself an employer) may be unable to plead its own case!

from their Association against such counter-bidding. The writer is informed that there is little variation from "industry" agreements among co-operative societies.

The second major element in "workplace" margins is the workers' system of payment. In general, the rise of actual wages appears most to exceed that implied by "industry" increases in trades where systems of adjusting wage-rates to the job in hand—and particularly piecework—are widespread, as in the mines, docks, engineering and textile trades.

Piecework systems fall under two main heads for this purpose. In industries where wage-rates have traditionally been fixed as piece-prices, these are commonly arranged as "industry" Lists,¹ as in steel and cotton. These Lists are historical deposits, and their frequent effect is that average hourly earnings increase with the more recent equipments, systems of working, or products—as well of course, as with the trade's general activity. Wages thus rise automatically with increasing productivity, and to this extent their increase ought perhaps to be reckoned as the mechanical effect of "industry" agreements. A calculation of *changes* in "industry" rates in steel, for instance, would have little meaning because these are mainly automatic "cost-of-living" additions distinct, for many operatives, from the wage-rate's central item. One can only say that average earnings in the industry are high. The calculation is more meaningful in cotton, where regular general additions to List-prices have been made. The rise of cotton operatives' hourly earnings since 1938 appears to have exceeded these "industry" increases by about 40 per cent., and this may be largely due to increased productivity—or (since most of the difference developed before 1946) to the disappearance of under-employment.² A rather similar situation appears in boot-and-shoe manufacture, where price-lists are also under a form of central control: here earnings seem to have risen about 15 per cent. faster than "industry" increases would account for, up to 1946, but only about 5 per cent. faster since then.³

¹The cotton term: "books," "statements" and "logs" are also common.

²See also Miss G. Evans', "Wage-Rates and Earnings in the Cotton Industry from 1946 to 1951" (*Manchester School*, Sept., 1953).

³This would seem in line with Mr. Knowles' data, "Earnings in the Boot and Shoe Industry" (with Miss Verry), *Bull. Oxf. Inst. Stats.*, Vol. 10 (2-3).

Most pieceworkers, however, are probably under the second system, in which prices are left to "workplace" bargaining. As in engineering, the practice is usually subject to some such "industry" rule as that it shall yield average earnings equal to or exceeding by a fixed sum or proportion the standard rates of timeworkers: but in important cases—notably the mines and docks—no such rule is specified, the "industry" time-rates merely serving as a minimum. The system generally operates where changes in working conditions, product, or equipment are frequent. Insofar as it has a theory, it is that earnings vary with the effort of the workers (more so upwards, since falls are often limited by the time- or "piecework basis" rate), but not necessarily with improvements in equipment or management except in so far as these promote *general* wage-adjustments. But in practice, every change in working conditions creates a new bargaining opportunity, the yield of which—the hourly wage—has a distinct upward bias. The men's average "workplace" margin appears to have grown to about 15 per cent. in engineering since 1938, for instance. But in such cases, apparently, the upward bias is *not* related to productivity. It is not possible to compare the three major industries mentioned in this connection over the whole period, and data on working hours is limited for two of them, but roughly, and since 1946, men's "workplace" wage-rates have increased at least 15 per cent. faster than those in "industry" agreements for mining,¹ about 10 per cent. in the docks,² but only some 4 or 5 per cent. in engineering.

Again, the pieceworkers' margin is unevenly distributed within industries. It has been shown to have largely safeguarded skilled steel and cotton workers against narrowed "industry" skill differentials, and actually increased the faceworkers' advantage over other miners.³ A major contrast concerns the engineering and shipbuilding industries, which employ several

¹Mr. K. Alexander, in a paper to the 1955 meeting of the British Association, put the excess rather higher, on the basis of detailed Coal Board returns.

²See also Mr. Knowles, "Dockworkers' Earnings" (with Miss Romanis), *Bull., Oxf. Inst. Stats.*, Vol. 14 (9-10).

³See the present writer's "Trade Unions, Differentials and the Levelling of Wages" (*Manchester School*, Sept., 1952).

major crafts in common, so that "industry" rates in the two groups have in recent years moved in exact step. In ship-building the reduction in relative skill differentials has been somewhat offset by the general extension of piecework to craftsmen (they have a traditional "sharing" system). In engineering, however, piecework bonuses have especially benefited semi-skilled operatives—whose average hourly earnings at recent censuses have exceeded those of craftsmen on time-rates.¹

Changes in the distribution of piecework may be analysed in some detail. As between it and time-work, the preference of many trades can be traced to their emergence from the Industrial Revolution—in some cases, ante-dates the latter. While its spread has not been greatly affected by the last generation's industrial upheavals, or the more recent official campaign for "incentive-payment." Eliminating, again, the effects of changes in the composition and industrial distribution of the labour force from the results of the Ministry of Labour's occasional censuses on the subject, one gets : ²

OPERATIVES IN "PRINCIPAL INDUSTRIES" (All figs. as a %)

	Oct. 1938	Oct. 1947	Oct. 1949	Oct. 1951	Oct. 1953
Proportion on "Payment by Results," all industries : }	25·8	26·9	28·9	31·5	31·2
Relative Increase of P.B.R. between dates in :					
Manufacturing	4·3	5·9	5·3	—0·7	
Other Trades	3·8	13·3	19·4	—0·2	

¹These things can be deduced from Mr. Knowles' tabulations of employers' returns in "Earnings in Engineering, 1926-1948" (with Mr. Robertson), "The Structure of Engineering Earnings" (with Mr. Hill) and "Earnings in Shipbuilding" (with Mr. Robertson), *Bull., Oxf. Inst. Stats.*, Vol. 13 (6), 16 (9 & 10) and 13 (11 & 12) respectively.

²The October, 1955 report has come too late for analysis, but suggests no significant change after 1953. One date at which a census was made—April, 1947—is not shown here. In estimating the effect of changes in age-and-sex composition I have had to make a rough allowance for the raising of the school-leaving age (very young workers are rarely employed on piecework) by assuming it entirely responsible for the small increase, in the proportion of pieceworkers between that date and October, 1947, remaining when other and calculable changes were allowed for. This almost certainly under-estimates the effect, which extended beyond October, 1947, and proportionately over-estimates the extension of "Payment by Results."

The table suggests that some part of the extension of "payment by results" was due to the adoption of "incentive schemes" (particularly by non-manufacturing trades) to escape the "wage-restraint" of 1948-50, and that these schemes sometimes lapsed thereafter: though its implication that the increase in piecework was almost entirely a post-war affair is misleading, since in 1947 textiles (traditionally piece-working) had an unusual proportion of time-workers pending the industry's reinstatement, and the builders' wartime bonus scheme had not been fully replaced. But nine-tenths of the operatives covered are in manufacturing, where the scope for an expansion of piecework beyond the occupations in which it is customary would seem to be much greater. And the prejudice of employers' codes against "plus-payments" does not usually extend to "incentives"—though the camouflaging of the former as the latter is only tolerated within limits.¹

In any case, the recorded extension of piecework does not indicate a parallel growth of "workplace" bargaining. Several employers' federations operate a "consultative" control over "incentive schemes." And the frequent intention (if not so much the effect) of the new "industry wage-structures" introduced in several traditionally piece-working trades since the war—cotton weaving, jute manufacture, boot and shoe—is to determine piece-work *earnings* centrally by the use of Taylorist techniques: operatives' wages vary with individual effort from a "target wage," but the results of changes in methods, etc. are compensated by an adjustment in "work-loads." The tendency of earnings under both the older piece-work systems to "run away" from time-rates is thus limited. And such "structures" have been supported by unions on grounds of uniformity and equity between their members.

In sum, the distribution and effect of piecework is very much influenced—its technical possibility apart—by the

¹The President of the National Federation of Building Trades Employers recently warned members against "... paying bonuses unrelated to output." Institution of a "100% bonus scheme" led (See Clegg, *op cit.*) to a rupture between Standard Motors and the federation of engineering employers—whose heterogeneity makes for an unusual tolerance. That, in manufacturing as a whole, the proportion of P.B.R. workers rises markedly with size of establishment may be partly due to this use of "incentives" (which include collective bonuses, etc.) by large firms

custom and practice of particular trades and occupations. And in this respect—as of the organisation and solidarity of employers—the general context of wage-fixing is slow to change.

“Plus-payments” and piecework bargaining seem largely to account for the extent to which the rise of *average* “workplace” wage-rates has exceeded that implied by “industry” advances. But the latter have themselves one curious feature. Overtime payments in October, 1938, probably did not exceed 2 or 3 per cent. of all industrial earnings : in October, 1954, they could be put at over 10 per cent. In reckoning the average “workplace margin,” this increase of overtime payment has been excluded, as due to the general reductions in the standard week made by “industry” agreements and awards in 1946/7. These were in fact initiated when short-time was extensive and earnings had fallen sharply because of the ending of war-work, so their immediate effect was to reinstate real pay-packets by raising hourly rates. But with “reconversion,” average working hours rose again, and have since 1950 moved about the 1938 figure. Overtime was previously regarded as the price of an exceptional variation from normal conditions. But since its effect is almost invariably to increase average hourly wage-rates progressively with the number of overtime hours, the general acceptance of a working week much above agreed standards as normal gives “industry” wage-rates themselves a novel flexibility. The current extent of overtime working varies widely—at least, among men, whose average hours in particular industries currently exceed their standard weeks by anything from nil to thirteen. The variation seems more closely (and, of course, inversely) connected with the wage-levels of particular trades than with their activity. Overtime has clearly become a systematic method of raising lower male wage-rates.¹

Part of the average “industry” wage-advance since 1938 has thus been made in a way that permits its variation at the workplace. But another effect may well have been merely to

¹Witness a recent *Manchester Evening News* advert. : “Building Trade : Labourers wanted. Lots of work and Long Hours. Apply . . . & Co.”—and the fact of strikes (though unofficial) against reduction of overtime. There are some notes on its distribution and effects in the present writer’s “Measuring Unemployment” (*J.R.S.S., Series A, Part I, 1955*).

give the "leisure-preference" of individual workers freer play : there is comparatively little variation in women's working hours, which rarely exceed their standard week. In any case, the distribution of overtime payment is not altogether free from arbitrary direction. In some trades, where overtime terms were first designed to heavily penalise employers who did not share out scarce work fairly, a high proportion of overtime payment is an accidental result of more plentiful employment and a reduced standard week : this particularly affects the docks.¹ In other cases, overtime working is restricted by long-established agreements—to the point in the cotton trade (where unions have a traditional objection to it) of being quite negligible.

There are, of course, other ways of amending "industry" rates. Pension and profit-sharing schemes are probably most important : these, however, have as yet had little effect on operatives' total wages.² But the allocation of "workplace margins" under their main heads—"plus-payments" (or underpayment) and piecework, as well as overtime—is clearly much directed by sectional collective history. These three possibilities are not generally-available alternatives. In some relationships one may offset the other. For instance, men's gain over women from overtime is offset by the latter's gain from the other factors (they do more piecework and are employed, on the whole, by less-organised employers) so that their respective "industry" rate movements are nicely reflected in the "workplace" sex-differential :

¹It may partially explain the high "workplace margin" previously estimated. *The Dockworker* (University of Liverpool, Social Research Series) estimated 29 per cent. of Manchester dockers' earnings in 1950/51 to be paid as overtime, but put average hours worked at just over 48 per week—about the current men's norm. See also Knowles & Romanis (*op. cit.*).

²Employers' contributions to pension schemes, etc., rose from 1½% of all factor income in 1938 to 2½% in 1954. But the allocation to directors, executives and salaried workers is not known.

WOMEN'S WAGE-RATES AS A % OF MEN'S

	1938	1954	Relative Gain (%)
"Industry" Rates for standard hours } 58	58	68	17
"Industry" Rates modified by overtime } 56	56	63	12
"Workplace" Rates (av. hourly earnings) } 52	52	61	17

But in some cases, like engineering, all three modifications to "industry" rates may operate. In others, none have any great effect. The relative deterioration in builders' and printers' status, because of equal flat-rate "industry" increases from 1939 to 1949, is aggravated by the restriction of "workplace margins" in these trades. The gain of agriculture from the same "industry" wage-movements is over the whole period reduced and in recent years reversed by the insignificance of "workplace" additions to farm-workers—to whom even over-time offers little compensation, since their standard week was only recently introduced and is still longer than the average. From 1947 to 1954, their wage-minima and earnings both rose 50 per cent. for men. Outside agriculture, men's "industry" rates rose only 42 per cent. : but their hourly earnings rose 53 per cent.

Summarily, then : variations from "industry" rates are limited to the very differing degree that institutional and customary arrangements also permit bargaining at the workplace. On actual relative wages, the impact of these diverse arrangements often appears somewhat random. But it seems capable of generalisation : other things being equal, the more direct the process by which wage-rates are determined, the quicker they change. One might call this the principle of Unequal Variation. And since full employment involves a general upward tendency of wages, its effect is clearly to extend the principle's application.

TABLE III
WAGE-MOVEMENTS, 1938-55

	Cumulative Rise in Average Weekly :				Annual Increase in Hourly "Industry" Rates	Increases in Weekly "Industry" Rates :		
	"Workplace" Wage-Rates	"Industry" Wage-Rates	A	As At		Proportion of Workers Getting	Average per Worker Getting	
	A	B	C			E	F	
	%	%	Ratio			%	s. d.	
1938-9	Nil	Nil.	—	Oct. 1938 starts	Nil.	(c) 68	(c) 1 3	1938-
1940	30	24	.80	Jly.	11.0	98	6 0	1940
1941	42	33	.80	Jly.	6.3	99	5 11	1941
1942	46 60	37 48	.80 .80	Jan. Jly.	5.1	(d) 75	5 1	1942
1943	65 76	52 62	.80 .81	Jan. Jly.	4.8	(d) 80	4 6	1943
1944	79 82	58 62	.74 .75	Jan. Jly.	4.7	(d) 96	4 7	1944
1945	76 80	56 59	.74 .74	Jan. Jly.	5.2	(d) 81	4 0	1945
1946	74 90	57 70	.77 .78	Jan. Oct.	13.5	(d, e) 89	7 3	1946
1947	94 103	77 83	.82 .81	Apl. Oct.	9.6	(e) 55	7 0	1947
1948	114 120	90 96	.80 .81	Apr. Oct.	6.2	84	5 0	1948
1949	124 129	97 101	.79 .79	Apr. Oct.	1.8	42	4 2	1949
1950	133 140	103 108	.78 .77	Apr. Oct.	1.1	59	5 6	1950
1951	156 165	124 131	.80 .80	Apr. Oct.	11.8	98	10 8	1951
1952	177 185	142 148	.81 .81	Apr. Oct.	7.8	92	7 9	1952
1953	196 201	157 162	.81 .81	Apr. Oct.	5.2	(d) 72	5 4	1953
1954	213 223	173 180	.82 .81	Apr. Oct.	4.5	81	6 11	1954
(a) 1955	242 250	195 199	.81 .80	Apr. Oct.	6.0	95	8 4	(a) 1955

For Notes on this Table, see Appendix B.

IV. "INDUSTRY" AND "WORKPLACE" RATES : INTERDEPENDENCE, TENSION AND CONTRADICTION.

The principle of Unequal Variation compares the movement of wage-rates at different levels of institutional wage-fixing. Whereas the Rule of Equal Increases described their tendency at a particular level. But between these two principles there is an obvious practical contradiction, which is demonstrated in the *general* relation between "industry" and "workplace" wage-rates. To represent the latter, Column A of Table III shows the cumulative increase in average industrial earnings at each census date since 1938. And Column B gives the increase in average "industry" wage-rates calculated on the same sex-age and industrial distributions of the labour force, and for the same working hours. Column C suggests that the relation between these two increases has, with two intervals, been constant (at between .80 and .82) throughout the period. Except over 1944-45 and again in 1949-50—when their divergence hastened temporarily—"workplace" wage-rates have apparently risen 25 per cent. faster than "industry" wage-rates at each date.

One is tempted to refer the constancy of this relation to the increase of productivity, to which several of the factors in earnings that cannot be estimated—skill upgradings, the increased yield of "industry" piece-rates, etc.—are nearly all related. But it has already appeared that "workplace margins" have risen faster in some major trades where physical productivity has lagged than in others where it has markedly increased. It seems unlikely that productivity rose in 1944-46. And in 1953 it fell, but the relative growth of "workplace margins" was unaffected.

The constancy may, however, be explained by an interdependence between "industry" and "workplace" wage-rates. Once a "workplace margin" has been established, it tends to become regarded as a minimal supplement. A major example is the widespread disputes that followed the engineering industry's attempt, in November, 1950, to reduce such margins by confining a general wage-increase to workers near the

"industry" rates.¹ Another : the ineffectiveness, revealed by the recent major dispute in the London printing trade, of that section of its 1950 agreement providing that "house" and "merit rates" be absorbed in the revised compositors' minimum. And a minor instance : the forced submission of the Standard Motor Co., in May of 1954, to its operatives' demands that, although "non-federated" and already paying rates known to be exceptionally high, it concede an increase previously agreed in engineering. "Workplace margins" rise, but cannot easily be reduced. There is thus a "ratchet" effect : even over the winter of 1954-5, for instance, when "industry" rates apparently made a minor jump, "workplace" rates maintained their relative gain.

The second aspect of this interdependence, however, is that an accelerated divergence of "workplace" from "industry" rates itself provokes an uprush of the latter. Table III's Column D shows that, except in the "wage-freeze" of 1949/50, "industry" advances have tended to settle to an annual minimum of about 5 per cent. A similar regularity is suggested by Column F : when "flat-rate" increases were the rule, at least, the advance conceded to those workers whose wages were adjusted in each calendar year characteristically ran at four or five shillings per week.² The abnormal widening of "workplace margins" in 1944-45 was probably associated with an attempt by operatives to offset, by workplace bargaining, that effect on pay of reduced working hours already noted. In 1949 and 1950, it clearly represents the partial evasion of the "wage-freeze" by "incentive" bonuses and the like, to which the Korean boom's onset no doubt added other "plus-payments." But in each case, a violent upsurge of "industry" rates followed—approximating to 11 or 12 per cent. in 1945-46 and again in 1950-51—which briefly reduced not merely the relative but the cash disparity between "workplace"

¹An arrangement, according to the then President of the A.E.U., which was "... the cause of more discontent among the workers, and hostility from them, than any wage-settlement over the (previous) twelve years. The chief reason, of course, was the fact that it did not provide for a general increase in wages."

²Column D has a different coverage and timing to Columns E & F, of course, and is certainly more satisfactory (See Appendix B).

and "industry" rates, and thus restored the more usual relation between their respective movements.¹

The interdependence thus involves a tension. And this also explains something of the persistence of wage-pressure since 1938. In trades where workplace bargaining freedom is preserved, wages have a permanent upward bias compared with those where wage-fixing is more exclusively centralised. The only collective remedy of railwaymen and agricultural workers, for instance, against the tendency of "workplace margins" in less-disciplined trades to grow is to demand an increase in their standard wages. But their success invokes a sequence of Equal Increases in *other* "industry" rates, which raises also the latter's superstructure of "workplace margins." The situation that induced the movement is thus restored.²

But such movements also actualise what has now appeared as the Rule of Equal Increases' own contradiction. The widening, since 1950, of cash differentials by percentage "industry" advances, for example, has already provoked a reaction from the lower-rated workers. The leader of the bigger general union warned the craftsmen in 1953 against "trying to break down the minimum living standards of our people to boost the wages of others." The contrary pressure of general and craft unions was a major factor in the two recent decisions of the engineers' confederation merely to claim (at first move) an undefined "substantial advance." The building trade's belated abandonment of fixed cash differentials in 1955 provoked its labourers to a separate claim for their restoration the following year. Unions in the vehicle industry returned in 1955 to "flat-rate" demands (to which one major "non-federated" firm, at least, made a partial concession). And so on. But to the various resentments that "equal" wage-advances incur, the regular palliative of wage-fixing bodies has so far been another Equal Increase.

¹For 1945-46, Table III's column D actually covers 15 months, this being when the census dates were changed. That the "industry" increase for 1939-40 was also 11% may suggest this to represent about the present institutional system's maximum tolerance.

²Thus, since this was written, the B.T.C.'s attempt to forestall (in Jan., 1956) a renewal of recent annual railway disputes by offering a 7% increase has been followed by a sequence of 7 to 8% rises in other unionised industries. Railwaymen's actual wages will therefore continue to lag behind those in the latter.

V. CONCLUSION : THE "WAGE-DRIFT."

The problem of persistent discrepancy, under full employment, between wage-rates collectively-determined and those actually paid has been given a certain international currency by Swedish labour-economists' description of it¹ as the "wage-drift." The point of this paper is that the "drift" is systematic in character.

Summarily, two structures of wage-rates may be distinguished. First, that established by centralised collective bargains and the like, which commonly relate to all the workers in particular industries. Both within and between these "industry" structures, there is an over-riding tendency for wage-rates to increase by similar amounts—equal cash advances predominating from 1939 to 1949, and equal percentage advances more recently.

The second structure is mainly composed by addition to "industry" rates in the workplace. In particular cases, the likelihood of such "workplace margins" depends largely on the extent or lack of solidarity among employers, and the degree to which piecework and similar systems permit supplementary bargaining by workers. A more limited factor is that the recent reduction of the standard week below normal working hours may sometimes permit "industry" rates to be adjusted by overtime. The opportunity of these additions is thus partly determined by the structure and technique of individual trades ; but it is also much influenced by their history, custom and established practice. It is therefore unequally distributed, both within and between industries. But its general effect is to permit wages to rise faster than under "industry" agreements alone.

The relation between these two structures is Sisyphean. "Workplace" margins rise, and workers who do not benefit demand "industry" increases in compensation. But parallel advances in "industry" rates are demanded by and conceded to the recipients of "workplace margins," who regard the latter

¹See for instance, the Report of the Swedish Confederation of Trade Unions, *Trade Unions and Full Employment*, p. 55 : "Rates and Earnings."

as established minimal additions to the former. So the gap between the two structures continues regularly to widen. Moreover, equal increases in "industry" rates themselves inevitably disturb their own relativities—if not in proportionate terms, then in those of cash.

In the contemporary institutional and economic contexts, then, pressure for wage-increases is perennially renewed by the relative distortions—manifest as conceived and recurrent inequities—that any general wage-movement itself induces. This is not, of course, to exclude other pressures. But it helps to explain why, for instance, wages should still go up when—as in 1953—prices are stable, and employment and profits are declined.

Socially, these things give wage-relations a quality of persistent irrationality. Economically, their effect is to submit the adjustment of wage-rates to both compulsions and restraints. Employers may to some extent counter restrictions on their ability to control relative wages by changing their hiring standards¹—as workers may also respond by varying their product or its quality. But against the loss they may suffer from such restraints, firms must also reckon the risk—of industrial dispute, for instance, or of rupture with an employers' association—involved in breaking through them. These risks are also costs.

A comment on wage-policy is also implied in this analysis. Any formal "restraint" of wage-advances—by public authorities or employers' federations, for example—can only directly limit "industry" rates. It may aggravate their discrepancy with "workplace" wages and itself induce an explosion of "industry" advances. Something of the kind clearly contributed (see Table III, again) to the failure of rigid "wage-freezing" in 1950: prices were stable from the unions' ratification of that policy in January, and did not catch up with "industry" wage-advances until six months after its September collapse. A sufficient increase of unemployment would, of course, control "workplace margins": in 1952/3, however, manufacturing

¹Of this possibility, there is an interesting recent discussion by Prof. Reder in "The Theory of Occupational Wage-Differentials," *American Economic Review*, Dec., 1955.

employment apparently fell about 5 per cent,¹ but the gap between the two wage-structures continued to widen. Otherwise, it seems that regulation of the "wage-drift," would require changes both major and detailed in the system and practice of wage-fixing itself.

H. A. TURNER

University of Manchester.

APPENDIX A.

NOTES ON TABLE II: "UNDER-PAYMENT OF STATUTORY MINIMA"

Calculated from Ministry of Labour, Annual Reports of Wages Councils Inspectorate, and Ministry of Agriculture, Reports of Proceedings under Agricultural Wages Acts.

The total number of pay-records inspected was about 250,000 in 1938 and 350,000 in 1953, equal to some 10% of workers subject to statutory wage-regulation. This is not a random sample, however, since about 10% to 20% of inspections are made following complaints from workers. From the more detailed agricultural reports, the proportion of workers underpaid appears greater on "complaint" inspections than on "test" visits, but (curiously) the average amount of arrears slightly smaller. The ratio of "test" to "complaint" inspections varies from time-to-time and from board-to-board. "Test" inspections were generally reduced in the war years, but the ratio now seems comparable to the pre-war one. Reported underpayment in agriculture is affected by the considerable post-war increase in "test" inspections there. More "test" inspections are made for newly established boards: this affects catering from 1946 to 1949, and thus the total results, particularly in 1948 and 1949. Results are also affected by the establishment of new boards or the winding-up of old ones. This particularly affects General Trade Boards, a group of Wages Councils being set-up for the distributive trades after 1947, and those in the furniture and rubber industries ceasing to function.

The proportion of workers underpaid represents those for whom the arrears reported were recovered. A proportion (about half in agricultural reports) of discovered underpayment cases are not pursued because of their triviality, the workers concerned having left, etc. Underpayment, however, includes arrears on secondary conditions—e.g. overtime, holiday payments, etc. Such items form the greater part of agricultural arrears. While the reduction of the standard week, and subsequent underpayment on overtime, may explain the jump in road haulage underpayment from 1947.

In General Trade Boards, the proportion of workers underpaid was the same as in 1938 over the preceding six years, but the average amount of arrears recovered was rather higher, at £4 6s. 8d.

¹See "Measuring Unemployment" (*op. cit.*).

APPENDIX B.

NOTES ON TABLE III : "WAGE MOVEMENTS 1938-55"

Note (a) : 1955 figures provisional.

Column A :

From Ministry of Labour reports on Earnings and Hours in the "Principal Industries."

Column B :

From Ministry of Labour index of weekly wage rates in "Principal Industries" modified for changes in age and sex composition and industrial distribution of labour force, in standard weeks, and in average working hours. Thus in April, 1954, the Ministry's index was 229 (Oct., 1938 as 100) ; but average weekly wage-rates were raised 9% by distributional changes (mainly age and sex) and 10% by reductions in standard weeks (average hours worked were the same as in 1938 at 46.5) ; resultant index of average "Industry" Wage-Rates, 273.

Column C :

Note (b) : Ratio of .80 assumed at dates from July, 1940, to Jan., 1943, for which no reports on average working hours. However, these can be estimated from the assumed ratio as follows :

	Oct. 1938	July 1940	July 1941	Jan. 1942	July 1942	Jan. 1943	July 1943
Average hours worked :	46.5	47.9	48.5	48.0	49.5	49.2	50.0

The result is doubly convincing, since it shows not only a steady increase of average hours up to the peak of war-time industrial mobilisation, but also the seasonal fluctuation which, in later censuses for which hours were actually recorded, led the Ministry to change the dates of its enquiries.

Column D :

From Ministry of Labour index of weekly wage-rates in "Principal Industries," as at July of each year to 1945, Oct. of each from 1946, and modified for changes in hourly rates under new standard week agreements.

Column E :

Derived from Ministry of Labour annual reports of cash changes in rates of wages, by calendar years. The total number of wage-earners in respect of whom reports were made appears to have been about 9 million up to 1948, and between 12 and 13 million from 1949 on.

Workers who get two or more increases in a year are counted once, and the concentration of wage-increases in the winter months may make annual fluctuations in this series misleading. For instance, in several industries wage increases have been virtually annual : but in one calendar year, a major group might get two increases, in the next calendar year no increase.

Note (c) : Figures for calendar year 1939.

Note (d) : Years in which the official cost-of-living index rose by less than 2%. Up to 1948 about 28% of workers covered were on "sliding-scales," after 1948 about 16%.

Note (e) : In 1946, 22% and in 1947, 56% of workers covered also had reductions in their standard week.

Column F : As Column E.

Exports and The British Trade Cycle: 1929¹

The role of exports in the causation of the British trade cycle has long attracted the attention of economists throughout the Anglo-Saxon world.² It is possible to distinguish two theses about the relationship between British dependence on international trade and the trade cycle itself—the first, that Britain exported cyclical fluctuations, and the second, that she imported them. The purpose of this paper is to examine three problems connected with the role of exports in relation to the British trade cycle. These may be distinguished as follows :—

(1) The General Problem

- (a) Did Britain import slumps or did they arise internally?
- (b) In the particular case of 1929 if the slump came from abroad where did it originate?

(2) The Seasonality Problem

Are harvests a critical factor in the turning-points? The tendency for the turning-points of British trade cycles to cluster in certain months of the year was a factor first noted by Lord Beveridge and led him to put forward a thesis that the turning-points of British trade cycles are to be explained on the basis of structural maladjustment between the manufacturing economies and those economies engaged in primary production.³

¹I am indebted to Professors W. A. Lewis and B. R. Williams and Dr. T. Wilson for helpful comments and suggestions, and to the staff of the Commonwealth Economic Committee for help in compiling Table VI. The paper is part of a longer study of British economic fluctuations during the inter-war period started whilst the author was Knoop Research Fellow in the University of Sheffield. The author of course assumes responsibility for any deficiencies which may remain.

²See especially the work of Beveridge, Cairncross, and Lewis in Britain, Gayer, Rostow and Schwartz in the U.S.A., and the work done in the University of Kiel, Germany, during the pre-war years.

³"Unemployment in the Trade Cycle," *Economic Journal*, Vol. XLIX, March, 1939, pp. 61-2.

(3) The Durability Problem

Given that certain trades tend to lead into and out of depression¹ how does demand move within the export group as a whole when classified on the basis of durability?

The turning-point of 1929 has been selected for special study because of the change in inter-area relationships which had taken place since 1914. The predominance of Britain in the world economy appeared to have weakened considerably as compared with her pre-war role, whilst that of the United States in particular had increased enormously.² The changed relationship of these two world sub-economies may have exerted some influence on the mechanism of the international transmission of the trade cycle, and for that reason a study of the turning-point of 1929 seems particularly interesting.

I. THE U.S.A. AND THE U.K.

The general problem which we have to deal with here is first, the nature of the interdependence of the primary producing and the manufacturing countries, and second, the nature of the relationship between manufacturing economies themselves. To what extent did the U.K. import the slump of the 'thirties from abroad, and was the U.S.A. suffering from any similar pressures on the external side? It is possible that there may have been forces at work within the primary producing economies which may have caused a fall in demand for the products of the manufacturing countries. In particular we have to examine the extent to which external forces may have set in motion the downswing which started in the U.K. in the second half of 1929.

Most of the data relevant to a consideration of this problem have been gathered together in Table I. So far as possible the ordering of the variables in the Table has followed the order in which the turning-points of each of the variables took place. The turning-points for exports of domestic produce and of retained imports for both the U.K. and the U.S.A. have been taken from seasonally corrected data. Both exports of domestic

¹W. Beveridge, *Full Employment in a Free Society*, Appendix A, pp. 299-300.

²See e.g., H. W. Arndt, *Economic Lessons of the Nineteen Thirties*, R.I.I.A., London, 1944, and T. Balogh, "The United States in the World Economy," *Oxford Institute of Statistics Bulletin*, Vol. 8, Oct., 1946.

produce and retained imports for the U.K. and the U.S.A. were corrected for seasonal variations by means of deviations from a twelve-monthly moving average. The most interesting fact which emerges from this statistical analysis is that exports of the domestic produce of the U.S.A. showed a considerable lead over the turning-point for total outlay and industrial production—seven months if we take November, 1928, as the turning-point in exports. Since cost-inflation does not appear to explain the fall in U.S. exports this seems to indicate that foreign demand was declining before internal demand. In the case of the U.K. we have a three-month lead, or if the trend of exports were taken as being more comparable with the quarterly figures for U.K. home activity we have a six-month lead.

TABLE I
TURNING-POINTS IN UNITED KINGDOM AND UNITED STATES
ACTIVITY, 1929

Variable	Turning-point *	
	United Kingdom	United States
Exports of domestic produce and manufactures	May, 1929	Nov., 1928 or March, 1929
	Trend, Feb., 1929	Trend, March, 1929
Retained Imports	Jan., 1929 with second peak Aug., 1929	April, 1929
	Trend, July, 1929	Trend, May, 1929
Total Outlay † (Consumption + Gross Home Investment)	3Q., 1929	3Q., 1929
Industrial Production	3Q., 1929	June, 1929
Unemployment	July, 1929	June, 1929 ‡

Sources : Foreign Trade : U.K., *Trade and Navigation Accounts*. U.S.A., *Survey of Current Business*, Feb., 1932.

Outlay : U.K., C. G. Clark, *National Income and Outlay*, London, 1937, Table 91, p. 202. U.S.A., H. Barger, *Outlay and Income in the United States*, New York, 1942, Table 11, p. 114.

Industrial Production : U.K., Board of Trade Index and L.C.E.S. U.S.A., *Survey of Current Business*.

Unemployment : U.K., E. H. Phelps Brown and G. L. S. Shackle, "British Economic Fluctuations, 1924-38," O.E.P., No. 2, May, 1939.

* The turning-points have all been determined from seasonally corrected data.

† From output statistics at 1930 prices for U.K.

‡ Employment data.

To what extent was this decline in foreign demand responsible for the slump in the United States and the United Kingdom? The most important considerations relevant to the ability of overseas countries to initiate depressions in the U.K. and the U.S.A. are the average propensity to export, the magnitude of the decline in exports, the marginal propensity to import and the size of the home multiplier in each country. Initially it is only the extent of the decline in exports within the foreign balance which is important for our purposes, and not the whole of the decline in the foreign balance. It is necessary to treat the two chief items within the foreign balance, *viz.*, visible exports and imports, quite separately when it comes to a study of the deflationary effects which might be exerted on the economy in question. Now the average propensity to export of the U.S.A. for the period under review was 6.6% of disposable income and 5.3% of gross national product (1927-9) with little variation as between years. From Table II we can get some idea of the initial impact of the decline in foreign demand on our two economies.

TABLE II
QUARTERLY CHANGES IN U.K. AND U.S.A.
EXPORTS AND IMPORTS, 1929 *

Quarter	U.K.		U.S.A.	
	Exports	Imports	Exports	Imports
	£mn.		\$mn.	
4/1 	+3.5	+6.6	+ 7	+103
1/2 	+1.1	+0.8	-125	+ 18
2/3 	-4.1	+0.3	+ 4	- 24
3/4 	-3.3	-0.2	- 53	- 62

* Figures for imports and exports have been seasonally corrected.

Taking the case of the U.S.A. first, the initial impact of the decline in U.S. exports before imports started to decline was in the $\frac{1}{2}$ quarter of 1929 and amounted to \$125mn. If we assume a home multiplier effect of 2.5 in a downwards direction then total income within the U.S.A. might be expected to fall

by about \$320mn. With U.S. national income running at about \$85,000mn. a quarter during this period we should expect a fall in income of about 0.5% which is very small. Dr. Wilson takes the change in the foreign balance itself to be the crucial variable and argues that the decline in foreign investment was small in 1929 as compared with the decline in 1926 when the U.S.A. suffered a much greater loss in foreign income, but this had little adverse effect on total income in the U.S.A.¹ But even if it were legitimate to take the change in foreign investment as the multiplicand the two cases are not quite parallel. That declining investment opportunities within the U.S.A. were the foremost factor in causing the magnitude of the decline in income and employment seems highly probable as Dr. Wilson points out. But since internal demand was much less buoyant in 1929 than in 1926-7 rather more prominence might perhaps be given the falling-off in foreign demand as an *initiating* factor in the situation. Although of itself it is quite clear in the case of the U.S.A. that the fall in foreign demand could not have caused a recession of any magnitude, coupled with the hesitancy of demand internally, it could have been a proximate cause.²

In the early part of 1929 the other strategic factors in the situation were nearly all favourable, although weakening. Fixed investment was still increasing up to the end of the third quarter of 1929,³ and the budgetary situation does not appear to have been inimical to expenditure.⁴ On the other hand, there was a fall in stocks somewhat larger than the decline in foreign investment.⁵ Some of the decline in foreign investment (though not necessarily in visible exports since the U.S. may simply have cut invisibles) may have been caused by a withdrawal of overseas loans in order to take part in the speculation on the New York stock exchange which was gathering momentum during

¹T. Wilson, *Fluctuations in Income and Employment*, London, 1942, pp. 143-4.

²As Professor R. A. Gordon remarks, the U.S. economy was becoming increasingly vulnerable to shocks from whatever source. "The Investment Boom of the 'Twenties'" in N.B.E.R. *Conference on Business Cycles*, New York, 1951.

³See H. Barger, *op. cit.*, pp. 114-19

⁴J. K. Galbraith, *The Great Crash*, 1929, London, 1955, p. 126.

⁵H. Barger, *op. cit.*, pp. 114-19.

the first half of the year. Borrowing by foreigners was becoming more difficult and new issues on foreign account were down by \$600mn., on the year. They shrank from 16.3 to 7.4% of all new issues.¹ Some of the deficit seems to have been made good by borrowings on the London stock exchange² where despite a fall of new issues on foreign account the proportion of these to the total of new issues remained fairly steady.³ Moreover as Ohlin points out many of the primary producers drew on their foreign balances in order to maintain imports.⁴

There remains the suitability of foreign trade statistics for indicating changes in demand at home and abroad. Now it might be argued that time lags between orders and deliveries might invalidate some of the reliance placed on figures of imports and exports as denoting changes in demand. In the case of exports a lag of deliveries behind orders would appear to increase the lead of foreign demand over internal demand unless the time lag between internal orders and output were the same as the foreign lag, in which case the two would simply cancel out. There is, however, some support in employment figures for the contention that they are not seriously faulty as indicators of a change in demand in that unemployment in the export-sensitive trades in the U.K. has its turning-point at a time which corresponds fairly well to the trend-turning-point in total U.K. exports.⁵ A lag theory between orders and deliveries of this type, however, would pre-suppose that all deliveries reflect definite orders, and not a situation where manufacturers make goods for stock in the hope of selling them on the base of reports of demand conditions in their overseas markets. Export practice would appear to be made up of a combination of the two types, with the export of capital goods more dependent on orders and consumer goods on stock. In the case of imports although many of the stocks of primary products are held in the manufacturing countries, so that

¹Ohlin, *Course and Phases of the World Economic Depression*, L.O.N., Geneva, 1931, p. 207.

²Ohlin, *op. cit.*, p. 209.

³Ohlin, *op. cit.*, p. 207.

⁴Ohlin, *op. cit.*, p. 213.

⁵E. H. Phelps Brown and G. L. S. Shackle, *loc. cit.*

imports may in fact lag somewhat behind changes in demand, we have also figures of employment and output to indicate the turning-point in the internal situation.

In contrast with the effects of a fall in foreign demand on the U.S.A. income which might eventually be slight if home demand were buoyant, the effects of a small decline of income in the U.S.A. on the rest of the world would be large. The ability of the U.S.A. to damage the rest of the world is much greater than the ability of the rest of the world to damage the U.S.A. During the year 1928 the U.S.A. took 12.4% of total world imports, half of which were raw materials.¹ A fall in U.S. imports would have serious effects on the Balances of Payments of the rest of the world, and in particular on those of the primary producers, especially when taken in conjunction with a relatively high foreign trade multiplier (approximately 3).²

Unlike the case of the U.S.A. the position of the U.K. with regard to the lead of exports over imports is somewhat confused. The seasonally corrected figures indicate that the turning-point in U.K. retained imports took place before that of exports of U.K. produce and manufactures, although there is a second peak in retained imports coming after the export peak. The trend data, however, do give a clear lead of exports over retained imports, and this is confirmed when we take the seasonally corrected data grouped quarterly. The extreme vulnerability of the U.K. to changes in overseas demand as opposed to the position of the U.S.A. is seen when we compare the average propensities to export of the two countries—21% for the U.K. as opposed to 6.6% for the U.S.A. There was hardly any downward change in U.K. retained imports until the change from the fourth quarter 1929 to the first quarter 1930. The initial impact of a fall in foreign demand would amount to £7.4mn., and coupled with a home multiplier of 2.5 would yield an initial decline in U.K. income of £18.5mn. National income in the U.K. was running at about £1,000mn. a quarter during

¹L.O.N., *Network of World Trade*, Geneva, 1942, pp. 16–17.

²The U.S.A. has the highest foreign trade multiplier in the table given by T. C. Chang, *Cyclical Movements in the Balance of Payments*, Cambridge, 1951, pp. 94.

1929, giving us an initial decline in national income of about 2%, much larger than in the case of the U.S.A. There might of course be a secondary impact on the home demand side of the Balance of Payments. Here imports take on their significance, but with a time lag. If insufficient foreign exchange were available then it is likely that incomes in the U.K. would have to fall in order to bridge the growing gap in the Balance of Payments, with the result that the impact of the decline in foreign demand would be all the greater. It is in this kind of situation that the foreign balance takes on its significance. In addition to the early turning-point in the trend of exports over that of the trend of retained imports we have further support for the initial impact of the decline in U.K. demand coming from abroad in the work of Professors Phelps Brown and Shackle already referred to above.¹ Employment in the consumption goods trades catering predominantly for the home market does not fall until October, 1929, in contrast with employment in the export sensitive trades which declines in March, 1929. Once again the British economy, like that of America was far from buoyant in the home market. Nor does home consumption of capital goods fall until the first quarter of 1930, having its peak in the final quarter of 1929.² On balance, the U.K. evidence also points in favour of a decline in foreign demand as a proximate initiating factor in the downswing.

Summing up this stage of the argument the evidence seems to point to the acceptance of a state of affairs where the U.K. and the U.S.A. were both feeling the impact of a decline in the foreign demand for their products during the early part of 1929, but with the effects far stronger in the U.K. than in the U.S.A. There may well have been a recession in the U.K. even if the home markets of both the U.S.A. and the U.K. had been buoyant. In the event it was the fall in United States imports which got under way during the second half of the year which caused the further contraction both abroad and in this country.

¹*loc. cit.*, see Table I.

²C. Clark, *National Income and Outlay*, London, 1937, Table 81, p. 182. The data are seasonally corrected.

II. THE PRIMARY PRODUCING COUNTRIES.

So far the investigation suggests that the U.K. and the U.S.A. were suffering from the operation of the same initiating factor though in different degrees. The proximate origin of the recession lay in a reduction in imports in certain of the primary producing markets. These economies are notoriously liable to more violent strains and excesses than those of the industrial nations, stresses which are due primarily to uncontrollable variations on the supply side. We need to examine the conditions which were ruling in these markets. Such markets are relatively more important in U.K. trade than in U.S. trade, the former sending 52% of its exports to these areas (excluding Canada) and the latter only 33%. Table III shows the relative importance of each of the U.K.'s overseas markets as they appeared in 1928. The following markets were regarded as primary producing areas: Australia, New Zealand, British India, South Africa, British Colonies, South America, Far East. Between them these markets took 52.6% of all British exports in 1928, and if Canada were to be included the share of these markets would rise to 57.7%. The low income per head primary producers (British Colonies, British India, Far East, South America) took 37.7% of all British exports. Such countries would obviously be in a position to influence internal events in the U.K. *via* fluctuations in their demand for British products. These economies tend to be unstable markets because of the vicissitudes of agricultural production where there are a large number of producers, and the possibilities of sudden mineral discoveries.

Which of the U.K.'s overseas markets led into the depression? Ideally we need monthly data for British exports going to each of these markets. Unfortunately it is not possible to obtain figures of the total amounts of British goods sent to each of these areas each month and all that is available so far as the inclusion of all U.K. exports going to these areas is concerned are quarterly figures, and these are not really adequate to the task in hand. It is, however, possible to abstract from the *Trade and Navigation Accounts* figures of exports shown as going to the various markets within each

TABLE III
EXPORT MARKETS OF THE UNITED KINGDOM IN 1928

Market	Value of Exports (£ths)	Per cent. of Total U.K. Exports
<i>Sterling Area :</i>		
Australia	55,654	7·7
British India	83,900	11·6
New Zealand	19,288	2·9
British Colonies	86,713	12·0
South Africa	31,503	4·3
Scandinavia	31,001	4·3
Industrial Western Europe...	104,908	14·5
<i>Dollar Area :</i>		
U.S.A.	46,666	6·5
Canada	34,466	4·7
South America	66,167	9·2
<i>Other :</i>		
Far East	35,732	4·9
All other countries	127,571	17·4
<i>Total U.K. exports</i>	<i>723,579</i>	

The following countries are included in the composite groups.

Scandinavia : Norway, Sweden, Denmark, Finland.

Industrial Western Europe : Germany, Netherlands, Belgium, France.

British Colonies : All British countries not separately specified, but excluding Eire, Channel Isles, and Hong Kong.

Far East : China, Japan, Hong Kong.

South America : Venezuela, Ecuador, Peru, Chile, Colombia, Brazil, Argentine, Uruguay, Bolivia.

sub-group within the classes of exports given, and these will give us a fairly good idea of how total trade was moving. Most of the sub-groups are split up so as to show the chief countries to which goods of that type were sent. The monthly totals so obtained are given in the statistical appendix. Because of the time involved in their collection data were obtained for only the three years 1928-1930 which cover the turning-point itself.¹ The nature of the figures can be gauged from the comments of Board of Trade officials writing on the foreign trade statistics of the U.K.

¹The monthly figures were corrected for seasonal variation by a modification of the method given by Professor A. L. Bowley in *Elementary Manual of Statistics*, London, 1945, p. 152, as being the most suitable method where only a small number of years are available. The original description is somewhat obscure at one point and the present method is a modification given by Professor D. G. Champernowne in lectures.

"The countries distinguished as sources or destinations under the various commodity headings are those which are the most important for that particular commodity, trade in that commodity with countries not separately distinguished being shown for 'Other Commonwealth Countries and the Irish Republic' and for 'Other Foreign Countries.' Both commodity and country headings to be distinguished in the *Accounts* are revised at the beginning of the year; they remain unchanged in each issue of the *Accounts* for that year. Trade with the most important trading partners of the United Kingdom will always be shown for a sufficient number of commodities for a fairly complete picture to be built up of the pattern of trade with that country. The process of extracting from the *Accounts* the figures for all the commodity headings for which the country is distinguished is, however, a rather laborious one; for all but the most important sources, a substantial part of the trade will remain in commodities for which no country detail is given, or for which the particular country was not considered sufficiently important as a source or destination to be distinguished in the *Accounts*. For commodity group totals, however, figures will probably be shown for a sufficient number of countries to give a complete summary of trade with all but the smallest trading nations."¹

The chief sub-group which was not split up into country detail was Class III F (Electrical goods and apparatus), but we can obtain some idea of which markets were most likely to have been affected by looking at the country classification of this group as given in the *Annual Statement of Trade*. These countries were in order of importance, with monthly averages in brackets in thousands of pounds—Australia (193), British India (125), South America (111), British Colonies (82), South Africa (57), and New Zealand and Industrial Western Europe (56 each). The remaining markets were all below £50ths., a month. However, this group breaks up into approximately the

¹J. Stafford, J. M. Maton, and Muriel Venning in R. G. D. Allen and J. E. Ely, *International Trade Statistics*, New York and London, 1953, p. 305. According to Board of Trade officials similar considerations are likely to have applied during the period 1928–30.

same sort of proportions of consumer non-durable, producer goods (raw materials), producer and consumer durables as do total British exports, so that we should not expect the timing of any turning-points obtained from the monthly figures to be seriously affected. Apart from this group most of the leading British exports to the different markets are included in the country break-downs given under each class sub-division. This was checked by an inspection of the twelve leading exports for each market as given in the *Annual Statement of Trade*. The monthly totals obtained would seem then to represent all the major U.K. exports to each of the overseas markets which were selected, and to be fairly representative of the remaining commodities. If such is the case the turning-points obtained from such monthly totals may be expected to correspond fairly closely to the turning-points for all U.K. exports to the selected markets, although the coverage will be better for some markets than others. Countries with a trade concentrated on a narrow range of commodities will tend to come out best. The market which suffers most is the group British Colonies where the individual countries are small purchasers of U.K. products compared with other purchasers. For the rest the coverage is between 50 and 70 per cent., of all U.K. export to these markets. We can of course say that the turning-points obtained fully reflect the commodities actually extracted. A list of commodities included as exports to each of the markets obtained from the commodity divisions in the *Trade and Navigation Accounts* is given in the statistical appendix.

Table IV gives the turning-points obtained from the commodity divisions in the *Trade and Navigation Accounts*, and the number of months lead over or lag behind the turning-point in total exports of U.K. produce and manufactures. This table of leads and lags lends support to the hypothesis advanced at the end of the last section. It is essentially the low income per head primary producers which tend to lead and the industrial, high income per head, raw material using countries which tend to lag. The exceptions are Australia and New Zealand.

TABLE IV
TURNING-POINTS OF U.K. EXPORTS TO CHIEF OVERSEAS
MARKETS

Market	Turning-Point	Lead (+) or Lag (-) over Total U.K. exports in months
South America ...	June, 1928	+11
Canada ...	August, 1928 (second peak May, 1929)	+ 9 (0)
British India ...	October, 1928	+ 7
British Colonies ...	October, 1928	+ 7
Far East ...	November, 1928	+ 6
South Africa ...	December, 1928 (second peak April, 1929)	+ 5 (+1)
Industrial Western Europe ...	May, 1929	0
United States ...	July, 1929	- 2
Scandinavia ...	November, 1929	- 6
Australia ...	November, 1929	- 6
New Zealand ...	December, 1929	- 7

The available evidence then suggests the following sequence of events. There was an early decline in demand in certain of the U.K.'s overseas markets, notably those of the low income per head primary producers—South America, British India, the British Colonies and the Far East. This fall in U.K. exports induced deflationary pressure on the British economy. The United States also experienced the pressure of similar forces but not to nearly the same extent as the U.K. Once the slump got under way in the U.S.A. and internal demand started to fall off total U.S. imports declined rapidly consequently inducing a second bout of deflationary pressure on the British economy.

III. THE SEASONALITY PROBLEM.

Evidence has been presented in Section II which suggests an early falling-off in the demand of certain primary producers for manufactured goods. We now need to examine the supply and demand conditions existing in these markets. Demand will depend mostly on income per head in these markets, and this in turn will depend partly on demand conditions in the manufacturing countries for the products of these markets and partly on the supply conditions of the products which those

markets export. Now supply in these markets will depend to a fair extent on the vagaries of the weather so far as agricultural products are concerned. This leads us naturally to consider the possibility of a harvest fluctuation theory, which may be regarded as a special case of a partial over-supply theory of the trade cycle. In his *Economic Journal* article of 1939 Lord Beveridge observed that the turning-points of British trade cycles had a tendency to occur at particular periods of the year and offered an explanation for this phenomenon which we may call the seasonality hypothesis. This suggests that there is a simple correlation between the harvest seasons of the northern and southern hemispheres and British trade cycle turning-points. The chief difficulty is that we never told clearly just what the mechanism is by which harvest fluctuations are transmitted to the rest of the world. It is however worth looking at the facts as they appeared in 1928/9.

The turning-points for the various U.K. overseas markets group themselves in the following way.

TABLE V
SEASONAL GROUPING OF TURNING-POINTS OF EXPORTS
TO U.K. OVERSEAS MARKETS, 1928/9

Jan.-Mar.	...	None
Apr.-Jun.	...	Industrial Western Europe (29) ; South America (28)
Jul.-Sep.	...	U.S.A. (29) ; Canada (28)
Oct.-Dec.	...	British Colonies (28) ; British India (28) ; Far East (28) ; Australia (29) ; New Zealand (29) ; South Africa (29) ; Scandinavia (29).

There does appear to be some clustering of turning-points at particular seasons of the year. What is really needed, however, is a much closer examination of the crop seasons in each of the individual markets. It is hardly adequate to say, as Beveridge does, that the turning-points depend simply on the harvest periods of the northern and southern hemispheres respectively because different crops have different harvest and export dates, and one crop may well be important in deciding the money incomes of producers in one area and not in another. It seems strange that such simple facts have not been examined before. There is no easy place to find the harvest dates for the various crops and seasons of maximum production, killings or export for animal products. An attempt to compile the requisite

information has been made in Table VI. This Table shows the chief agricultural commodities entering international trade produced by the U.K.'s overseas markets. Whilst the correspondence between the turning-points for the different markets and their chief primary products differs somewhat according to the product the correlation between harvest or export seasons is on the whole fairly good. The results for the individual areas are as follows :—

Good : Australia, New Zealand, Canada, Far East.

Fair : British India, British Colonies, South America.

Poor : South Africa.

The hypothesis has some evidence in its favour though it is not wholly one-sided.

We now need to return to the possible mechanism by which harvest fluctuations may be expected to affect the money incomes of primary producers.¹ We may distinguish between the effects of bad and good harvests. Bad harvests are usually regarded as having a deflationary effect because the fall in quantity generally outweighs the favourable effects of any price rise. If, however, there existed any unsold stocks from the previous years these might be expected to lend stability to prices, but might well have a further deflationary effect on producers' money incomes of the current period. Good harvests might likewise be regarded as adding to the purchasing power of the agricultural community. The effects in this case are however more difficult to disentangle in that a series of good harvests might well prove deflationary unless demand were to keep pace with the increase in supplies. Now the demand for foodstuffs and textile raw materials is usually price-inelastic in a downwards direction so that we should not expect sales to increase much as a result of any price fall which took place, and so compensate producers for the loss in money income arising from the excess supplies.

¹For a general discussion of this problem and references see G. Haberler, *Prosperity and Depression*, United Nations, 3rd edition, New York, 1946, and J. M. Keynes, *General Theory of Employment, Interest and Money*, London, 1936, pp. 329–32.

TABLE VI
HARVEST AND EXPORT SEASONS IN PRINCIPAL U.K. OVERSEAS
MARKETS *

Export Market	Commodity	Per cent. of Total Exports	Harvest Dates or Seasonal Peak	Export Season
Australia (Nov., 1929)	Wool	38·9	Most of year	Oct.—Dec. March Jul.—Oct.
	Wheat	14·4	Sales/Sept.	
	Butter	4·9	Nov.—Jan.	
	Beef and Mutton	4·0	Nov.—Jan. (variations) May—Aug. Nov.—Jan.	
New Zealand (Dec., 1929)	Wool	27·4	Most of year	Oct.—Jan.
	Mutton	22·3	Feb.—Mar.	
	Butter	20·9	Nov.—Jan.	
British India (Oct., 1928)	Cotton	21·4	Oct.—Jan. (North) Nov.—Feb. (Central) Feb.—Apr. (South)	
	Jute	8·9	Begins Jul.	
	Tea	8·5	Mar.—Apr. Jun.—Jul.	
South Africa (Dec., 1928 or Apr., 1929)	Wool	16·4	Sep.—Jun.	
British Colonies (Oct., 1928) :				
Nigeria	Palm Oil	21·4	Crushed all year	esp. Nov.—Jan. " "
	Cocoa	11·6	Oct.—Apr.	
Gold Coast	Cocoa	73·4	"	
Ceylon	Tea	50·1	All year	
	Rubber	26·3	"	
Malaya	Rubber	46·8	"	
West Indies †	Cocoa	25·0	Sep.—Nov.	esp. Nov.—Jan.
	Sugar	16·7	Jan.—Jul.	
North America :				
Canada (Aug., 1928)	Wheat	28·5	Aug.—Sep.	Moved before St. Lawrence freezes
United States (Jul., 1929)	Cotton	17·9	Aug.—Dec.	
	Wheat	4·6	Winter, May—Jun. Spring, Aug.—Sep. (sometimes early)	
	Tobacco	3·0	Export crop Jul.—Dec.	

[Continued overleaf.]

TABLE VI—continued.

Export Market	Commodity	Per cent. of Total Exports	Harvest Dates or Seasonal Peak	Export Season
South America : (Jun., 1928) :				
Argentina	Wheat	22.2	Nov.—Jan.	
	Maize	18.5	Mar.—Jun.	
	Beef	7.5	May—Jul.	
Brazil	Coffee	71.8	May—Sep.	Peak Jul.
Far East (Nov., 1928) :				
China	Silk	19.4	Spring and Autumn	
	Cotton	3.7	Sep.—Oct.	
	Tea	3.3	Mar.—Apr.; Jun.—Jul.	
Japan	Silk	32.2	Spring and Autumn (equal in quantity)	

* Percentages of total exports are by value for each country for the years 1924–9 or nearest dates. Source : Chisholm, *Handbook of Commercial Geography*, London, 1932. See under references to various countries. Information on harvest dates compiled with the help of the staff of the Commonwealth Economic Committee.

† These export percentages and seasons relate solely to Trinidad and Tobago.

On the supply side a situation such as that outlined above appears to have existed during the second half of the decade of the 'twenties, with a consequential deflationary effect on the incomes accruing to primary producers.¹ Technical progress in agricultural production, which in the nineteenth century had tended to lag behind advances in manufacturing techniques, increased rapidly during the early part of the twentieth century, with a consequent worsening of the terms of trade of the primary producing economies *vis-à-vis* the manufacturing economies.² The war of 1914–18 had, as Professor Lewis points out,³ the effect of holding back the rate of increase of manufacturing production relative to agricultural production.

¹This can be seen from an inspection of statistics of the primary commodities given in Table 9 in *World Production and Prices*, 1925–34, L.O.N., Geneva, 1935, and in the appropriate numbers of the *International Yearbook of Agricultural Statistics*, Rome.

²cf., Sir Hubert Henderson, "International Economic History of the Inter-War Period" in *The Inter-War Years*, Oxford, 1955, pp. 254–5.

³"World Production, Prices and Trade, 1870–1960," *Manchester School*, May, 1952.

Consequently the demand side for primary products was not nearly as strong as it might have been. On the other hand the war had encouraged over-extension of capacity in some areas relative to the pre-war demands of the manufacturing nations, though it lowered it in others, and the series of good harvests in the second half of the 'twenties did nothing to help counteract this state of affairs. But it is extremely difficult to say just when such a succession of good harvests might have been expected to have serious deflationary consequences on the purchasing power of producers within any particular one of the U.K.'s overseas markets. So far as individual markets are concerned the harvests of the primary products appearing in Table VI were, with few exceptions, good or fairly good for the years 1928-9. The falls in quantities produced or exported which might have proved critical were as follows :

Australia : Wheat, 1929. Fall in export volume coupled with a price fall, but compensated for by wool and butter.

New Zealand : Mutton, 1929. Fall in export volume but compensated for by price rise.

South Africa : Wool, 1928. Fall in export volume.

British Colonies : West Indies cocoa, 1928, but more than compensated for by other products in this market.

Canada : Wheat, 1929.

U.S.A. : Wheat and cotton, 1929. Latter compensated for by price rise.

South America : Argentine maize, 1928, compensated for by price rise ; beef, 1928, with small price rise ; Brazil coffee, output lower but exports maintained, price fall.

Some idea of the amount of deflationary pressure which might have come about through the accumulation of stocks pressing on the international markets may be gathered from Table VII.

TABLE VII
PERCENTAGE INCREASE OR DECREASE IN STOCKS OVER
PREVIOUS YEAR

Commodity	1925/6	1926/7	1927/8	1928/9
Wheat * (Total stocks) ...	+14	+ 6	+22	+35
Wool ... ..	..	..	..	+40
Tea (U.K.)	- 8	0	+19	+10
Cocoa (Europe and New York ...	- 8	-12	+32	+29
Coffee (World)	+69	+17	+57	0
Sugar (Total visible supply) ...	+48	-14	+23	+18
Cotton * (Total world stocks) ...	+30	+23	-17	- 5
Silk (Visible supplies)	+ 1	+14	- 1	+14
Maize † (Visible supplies) ... ..	..	..	..	-20
Copper (World stocks)	- 1	- 3	-19	+10
Tin (World stocks)	-24	- 7	+11	+29
Rubber (World stocks)	+27	+39	+14	+14

Unless otherwise stated the figures are from yearly averages.

* 1st Aug.

† Beginning of year.

Source : L.O.N., *World Production and Prices, 1925-1932*, Geneva, 1933.
 Series II, Econ. and Financial, 1933, II, A.12, Appendix I, Table 6.

Apart from these considerations we must look at the period when the price breaks occurred for each of the principal commodities exported by the U.K.'s overseas markets. For many of the primary producers the prices fixed early on during the sales (where this is the method of marketing and fixing the prices of the product in question) will be indicative of what their output may be expected to fetch. Under such circumstances any signs of a weakening of prices over those ruling during the previous year may well involve a fairly early curtailment in their purchases of other goods and services. Table VIII shows the periods when the price break occurred for each of the principal commodities produced by each market. The table has been arranged so as to indicate both conditions of supply and demand. Climatic conditions have been shown as likely to influence supply, whilst on the demand side the products have been classified (a) according to type of product and its chief market (sterling or dollar market) and (b) according as to whether the product was produced by countries enjoying a high or low income per head. The former considerations may be expected to influence the demand for

TABLE VIII
BREAKING POINTS IN PRICES OF PRIMARY PRODUCTS *

DEMAND CONDITIONS	SUPPLY CONDITIONS
(As markets for U.K. exports)	
Sterling Commodities	
(As affecting demand for product)	
	Temperate Products
(i) High Income per head Markets.	
(a) Food Products	
Wheat ... Aug./Sep., 1929	
Butter ... Oct./Nov., 1929	
Beef ... Jan./Feb., 1930	
Mutton ... Feb./Mar., 1930	(New Zealand : bad break Apr., 1930)
(b) Industrial Raw Materials	
Wool ... Sep., 1929	
(ii) Low Income per head Markets.	Tropical or Sub-Tropical Products
(a) Food Products	
Cocoa ... Jan. and Aug., 1928	
Maize ... Nov., 1928	
Tea ... Apr./May, 1929	
(b) Industrial Raw Materials	
Cotton ... Jul., 1928	
Jute ... Aug./Sep., 1928	
Dollar Commodities	
Low Income per head Markets.	Tropical or Sub-Tropical Products
(a) Food Products	
Coffee ... Sep./Oct., 1928	
Sugar ... None : gradual decline	
(b) Industrial Raw Materials	
Rubber ... Feb., 1928	
Silk ... Sep./Oct., 1928	
Tin ... Nov./Dec., 1928	

* Unless otherwise stated the price breaks apply to all primary producing markets.

Sources : *International Yearbook of Agricultural Statistics, 1927-1930*, Rome. M. T. Copeland, *Raw Material Prices and Business Conditions*, Harvard, Business Research Studies, No. 2, May, 1933, Table 42.

the product and so its expected receipts of foreign currency, and the latter may influence the volume and type of sales of British exports.

The correlation between price breaks and turning-points of U.K. exports to the individual markets varies, the markets producing temperate commodities tending to come out best (Australia, New Zealand, Canada) and the tropical areas less well, except in so far as their tendency to lead in the turning-points of U.K. exports coincides with their tendency to lead in the price breaks. As opposed to these early price breaks

for the products of the tropical markets the prices of manufactured goods as measured by the Board of Trade wholesale price index number (non-food section) did not break until November, 1929. The terms of trade thus appear to have been moving against those countries from the third quarter of 1928. As against this, changes in the U.K. terms of trade as measured by the quarterly average value import and export price index numbers do not improve until the third quarter of 1929.

The price evidence gathered in this table again suggests the following sequence of events. Instability in the demand for manufactured goods on the part of the tropical and sub-tropical, low income per head primary producing areas led to a fall in their demand for U.K. and U.S. exports. It is noticeable that the price breaks in tropical and sub-tropical food products tend to lead those of the temperate food products, and, with the exception of tea, fall within the period August–November, 1928. The price breaks of the tropical industrial raw materials also show a similar lead and, with the exception of rubber, fall within the period July–November, 1928. A detailed study of the reasons for the price breaks in each case is beyond the scope of this paper : but in some cases a partial cause of the break may be traced to harvest conditions ; in other cases the crucial factor may have been a weakening of demand on the part of the manufacturing countries for raw materials.¹ Adverse supply conditions would tend to be more disturbing when acting on a market where the rate of increase in consumption of raw materials was showing a tendency to fall.² The decline in U.K. incomes and employment which got under way during the second half of 1929 (due partly to the decline in the demand for U.K. exports on the part of consumers in her tropical markets, and subsequently to events in the U.S.A.) then led to a fall in consumption of the products of the temperate

¹So far as individual markets and their commodities are concerned some information about their economic conditions is available in the pre-war publications of the Imperial Economic Committee, in the *Royal Economic Society Memo.*, No. 17, by Keynes and Rowe, Aug., 1929, and in the monograph by M. T. Copeland already cited.

²Some indication that this may have been the case may be gathered from the statistics of consumption of raw materials given by C. T. Saunders, "Consumption of Raw Materials in the United Kingdom : 1851–1950," *Journal of the Royal Statistical Society*, Vol. CXV, pt. III, 1952, pp. 342–6.

primary producers, which in turn were forced to cut their consumption of U.K. products (the turning-points in U.K. exports to Australia and New Zealand occurred in November and December, 1929, respectively).

IV. THE DURABILITY HYPOTHESIS.

In order to discover which type of goods led into the depression within the export group as a whole, exports of United Kingdom produce and manufactures were divided up into four sub-groups, *viz.*, consumer goods (non-durable), consumer goods (durable), producer goods (raw materials), and producer goods (durable). The *Trade and Navigation Accounts* of the United Kingdom give exports of U.K. produce and manufactures month by month in sufficient detail to permit such a division to be made, and details of the goods included within each of these sub-headings are given in the statistical appendix. The division differs somewhat from that made by Professor Phelps Brown and Shackle of unemployment figures in their paper on British economic fluctuations.¹ The chief difference between the present division and theirs lies in the distinction within the export group of a sub-grouping called producers goods (raw materials), a grouping which the Phelps Brown-Shackle analysis does not utilize, but which is an important grouping from the point of view of the present analysis. A further difference lies in the treatment of consumer durables, which in the Phelps Brown-Shackle division includes building and paint, whilst minor differences exist in the inclusion of some of the miscellaneous goods of the Phelps Brown-Shackle within the consumer goods (durable) division of the export list. Nevertheless sufficient similarity exists between the two sets of groupings for some comparisons to be made. The data for export groupings were corrected for seasonal variations by the same method as was used in the case of the country division of U.K. exports. The following table gives the turning-points for the different commodity groups obtained from the seasonally corrected data, and a matrix showing the number of months lead or lag of each group over the other groups, is included below.

¹*Loc. cit.*

TABLE IX
TURNING-POINTS OF EXPORT COMMODITY SUB-GROUPS

Commodity Group	Turning-points	
	Seasonally corrected data	Trend
All exports	May, 1929	Feb., 1929
Consumer non-durables	June, 1928	Aug., 1928
Consumer durables	May, 1929	June, 1929
Producer goods (raw materials) ...	May, 1929	June, 1929
Producer durables	Jan., 1929	Dec., 1928

MATRIX OF LEADS AND LAGS IN EXPORT SUB-GROUPS*
(in months)

Group	Total Exports	Cons. (N.D.)	Cons. (D)	Prod. (R.M.)	Prod. (D)
Total Exports	—				
Cons. (N.D.)	+11	—			
Cons. (D)	0	-11	—		
Prod. (R.M.)	0	-11	0	—	
Prod. (D)	+ 4	- 7	+4	+4	—

* Leads are indicated by a + sign and lags by a — sign. The matrix is to be read downwards.

The following table gives the turning-points in the unemployment statistics according to the divisions made by Professors Phelps Brown and Shackle,¹ and a matrix similar to the one constructed for the export data can also be compiled.

The most striking results which emerge from a study of these two matrices are the huge lead of consumer goods (non-durable) over total exports in the export matrix, and the lead of the export sensitive trades in the employment matrix, which has already been discussed. If we neglect this last aspect and concentrate solely on the durability hypothesis the employment

¹*Loc. cit.*

TABLE X
TURNING-POINTS IN UNEMPLOYMENT SERIES

Industry Group	Turning-point
Total employment	July, 1929
Export sensitive trades	March, 1929
Consumer goods (non-durable)	October, 1929
Consumer goods (durable)	July, 1929
Producer goods (durable)	October, 1929

MATRIX OF LEADS AND LAGS BASED ON UNEMPLOYMENT
PERCENTAGES *

Group	Total employment	Cons. (N.D.)	Cons. (D)	Prod. (D)	Export
Total emp.	—				
Cons. (N.D.)	—3	—			
Cons. (D)	0	—3	—		
Prod. (D)	—3	0	—3	—	
Export	+4	+7	+4	+7	—

* This matrix is to be read in a similar fashion to the export matrix.

turning-points range themselves in the order—consumer durables, consumer non-durables, equal with producer durables, in contrast with the ordering within the export group as a whole—consumer non-durables, producer durables, and consumer durables equal with producer goods (raw materials). There is a marked lead in the falling-off into depression of consumer non-durables in the overseas markets of the United Kingdom in contrast to the lag at home. Whilst producers durables tend to coincide with consumers non-durables in the home market they show a considerable lead in the overseas markets.

In its strict form the Acceleration Principle requires that the output and sales of capital goods shall decline as soon as the rate of increase in the output or sales of consumer goods slackens. Whilst the Clark estimates of outlay in the United Kingdom ¹ lend a little support to the Acceleration Principle with outlay on capital goods declining in the fourth quarter of 1929 and outlay on consumption goods not falling off till after

¹*Op. cit.*, Table VIII.

the first quarter of 1930, neither the figures for unemployment nor those for exports lend any support at all to the theory. Even if the theory is not held so rigidly as this but is put in the modified form of Mr. Kaldor's capacity principle¹ with a simple increase in consumption leading to an increase in capital expenditure though not proportionally to the increase in sales of consumers goods, the evidence is almost overwhelmingly against this at least in any aggregate form for the turning-point of 1929. In the case of the employment figures and the export figures we have a more accurate form of evidence than quarterly figures of outlay since data for both these series is available monthly. In addition the method of compilation of the original data in both cases renders the final results so obtained more accurate than those for expenditure. In the case of the employment matrix we can readily see that both the turning-points for consumers goods (non-durable) and for producers durables take place at exactly the same time. In the case of exports the evidence against is even stronger, consumers goods (non-durable) turning downwards seven months before the decline in the overseas sales of producers durables. It is of course impossible to test the validity of such theories for individual industries because of the lack of information about capital formation for the various industrial sectors for the period under review.

Turning to a further consideration of exports themselves the second most striking fact about the export matrix is the eleven month lag of exports of producer goods (raw materials) behind consumer goods (non-durable). Now there appears to be some degree of correlation between the turning-points for different economic classes of goods and the leads and lags displayed by the different overseas trade areas. Entry into recession of countries importing chiefly producer goods of the raw material kind lag behind those importing goods chiefly of the consumer goods (non-durable) variety. As in the Section III we may group the overseas trading areas of the United Kingdom in the following manner:—low income per head, tropical or sub-tropical primary producers, high income

¹"The Relation of Economic Growth and Cyclical Fluctuations," *Economic Journal*, Vol. LXIX, March, 1954.

per head, temperate climate primary producers, and high income per head industrial importers of raw materials.

Now countries of the first of these groups tend to import a higher proportion of consumer goods (non-durable) than the other two types of market. The second type is rather more balanced and tends to import a much lower proportion of consumer non-durable but a higher proportion of capital goods and consumer durables, but on the whole a low proportion of raw materials. The third group of countries tend to import a high proportion of raw materials and consumer durables. When compared with the table showing turning-points of exports to overseas markets this grouping becomes highly suggestive. The implication is that it was the primary producers and importers of consumer non-durables of the first kind which entered the recession first, and that this reduction in demand caused a decline in the output of countries importing largely raw materials. This in turn would involve a reduction in imports from the primary producing areas to the industrial economies. Imports into both the United Kingdom and the United States were already declining before the peak in economic activity had been reached in those countries. Demand for imports on the part of the industrial economies appears to have been weakening during the third quarter of 1929, and certainly by the fourth quarter, just at the time when the harvests and wool sales of the second group of primary producing countries were taking place. United Kingdom exports to both Australia and New Zealand had their turning-points during the fourth quarter of 1929. It does not seem to be just coincidence that the chief industry which Lord Beveridge noted as leading into depression in this country, namely, cotton textiles, provides a large share of the imports of those countries to which the United Kingdom exports tended to fall off first.

V. CONCLUSIONS.

The preceding investigation suggests the following tentative conclusions. The international mechanism of the down-turn in economic activity far from being the simple affair sometimes imagined in neat little mathematical models was extremely complicated. There appears to have been more than one cause

of the down-turn in activity within the U.K. itself. What seems to have happened was that there was an early weakening of demand on the part of the low income per head primary producers for U.K. and U.S. exports, and in the case of the U.K. the direct evidence of exports to those areas is supported by the long lead in the down-turn of consumer goods (non-durable) over total exports (the type of goods demanded by the low income per head markets). The reasons for this early decline must be sought in the factors making for the early price breaks in those commodities produced by the tropical and sub-tropical primary producers. For some commodities supply conditions give part of the explanation, both general supply conditions as they existed in the second half of the nineteen twenties, and more particular supply conditions in the form of harvests. But the latter probably become of importance only when acting on markets for commodities which have lost their buoyancy. Demand conditions in 1928 for many of the commodities appear to have been rather unfavourable in this respect. A full explanation would require a detailed study of the individual markets for each of the important internationally traded commodities.

The effect on the U.K. would, however, not have been so important had the home market been in a more healthy condition. It seems likely that Britain would have suffered from some recession in economic activity had there been no decline in incomes and employment in the U.S.A. The situation in the U.K. was intensified by the fall in U.S. activity which got under way during the second half of 1929, due primarily to an exhaustion of investment opportunities in that country, but a fall which was set in motion, at least in part, by conditions abroad. Finally there was a weakening in the markets for certain sterling commodities, principally animal products and wheat, which resulted from the fall in U.K. incomes, simultaneously inducing a cut in the demand of the high income per head, wheat and meat producers—Australia and New Zealand—for British goods.

D. C. CORNER

*University College of North Staffordshire,
Keele.*

STATISTICAL APPENDIX.

TABLE XI—EXPORTS OF U.K. PRODUCE AND MANUFACTURES TO OVERSEAS MARKETS. £ths. 1928
(As compiled from "Trade and Navigation Accounts of U.K.")

Overseas Market	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Australia ...	O. 2,829 2,320	2,335 2,223	2,398 2,515	1,791 2,227	2,355 2,350	2,330 2,578	2,747 2,467	2,352 2,322	2,234 2,385	2,300 2,242	2,459 2,377	2,305 2,421
New Zealand ...	O. 882 700	O. 808 771	O. 697 793	O. 713 863	O. 578 703	O. 802 875	O. 975 790	O. 965 836	O. 663 716	O. 822 812	O. 778 808	O. 774 792
British India ...	O. 5,207 4,416	O. 5,814 4,447	O. 5,981 5,052	O. 5,202 4,762	O. 4,374 4,450	O. 4,011 5,107	O. 4,702 4,724	O. 5,293 5,257	O. 4,389 5,102	O. 5,230 5,398	O. 4,860 5,007	O. 4,599 5,244
British Colonies ...	O. 1,595 1,550	O. 1,436 1,609	O. 1,775 1,683	O. 1,485 1,535	O. 1,387 1,406	O. 1,566 1,678	O. 1,502 1,429	O. 1,625 1,654	O. 1,263 1,421	O. 2,056 1,810	O. 1,906 1,774	O. 1,534 1,600
South Africa ...	O. 1,207 1,071	O. 1,288 1,251	O. 1,373 1,324	O. 1,099 1,223	O. 1,224 1,106	O. 974 1,209	O. 1,429 1,291	O. 1,254 1,210	O. 1,101 1,189	O. 1,359 1,267	O. 1,294 1,299	O. 1,246 1,403
Scandinavia ...	O. 844 899	O. 985 990	O. 1,001 963	O. 810 861	O. 875 818	O. 862 957	O. 856 855	O. 1,012 936	O. 918 922	O. 959 872	O. 914 824	O. 683 814
Industrial Western Europe ...	O. 5,269 4,755	O. 5,466 5,432	O. 5,617 5,374	O. 4,634 4,998	O. 4,723 4,630	O. 5,151 5,448	O. 4,552 4,485	O. 5,705 5,418	O. 4,322 4,810	O. 5,409 5,111	O. 5,022 5,015	O. 4,583 5,003
United States ...	O. 2,089 2,083	O. 1,887 1,903	O. 2,366 2,071	O. 1,987 2,088	O. 1,935 1,778	O. 2,190 2,364	O. 1,805 1,806	O. 1,969 2,049	O. 2,046 2,102	O. 1,857 1,851	O. 1,898 1,743	O. 1,924 2,119
Canada ...	O. 1,467 1,465	O. 1,206 1,375	O. 1,321 1,505	O. 1,112 1,377	O. 1,483 1,276	O. 1,321 1,470	O. 1,713 1,471	O. 1,638 1,541	O. 1,398 1,365	O. 1,428 1,188	O. 1,467 1,239	O. 1,189 1,489
South America ...	O. 2,821 2,661	O. 2,934 2,874	O. 2,966 2,947	O. 2,675 2,998	O. 2,836 2,890	O. 3,068 3,193	O. 3,449 3,034	O. 3,174 2,914	O. 2,416 2,675	O. 3,149 3,086	O. 2,969 3,017	O. 2,631 2,793
Far East ...	O. 1,710 1,442	O. 1,182 1,495	O. 1,703 2,069	O. 1,091 1,740	O. 1,459 2,072	O. 2,195 2,368	O. 2,364 2,133	O. 2,479 2,326	O. 1,503 1,953	O. 1,883 2,134	O. 2,383 2,415	O. 2,084 2,136

O. : Original.

S.C. : Seasonally corrected.

TABLE XII—EXPORTS OF U.K. PRODUCE AND MANUFACTURES TO OVERSEAS MARKETS. £ths. 1929
(As compiled from "Trade and Navigation Accounts of U.K.")

Overseas Market	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Australia ...	O. 3,018 S.C. 2,509	2,421 2,318	1,862 1,979	2,033 2,469	2,613 2,608	2,044 2,292	2,513 2,233	2,746 2,716	2,289 2,440	2,747 2,689	2,800 2,713	2,443 2,559
New Zealand ...	O. 1,016 S.C. 834	822 785	692 788	648 798	756 881	695 768	1,002 817	989 860	782 835	900 890	870 900	904 922
British India ...	O. 5,782 S.C. 4,991	5,238 4,571	4,999 4,070	5,247 4,807	4,408 4,484	3,004 4,100	4,599 4,621	4,721 4,685	3,726 4,439	4,114 4,282	4,312 4,459	3,089 3,734
British Colonies ...	O. 1,515 S.C. 1,470	1,317 1,490	1,488 1,396	1,564 1,614	1,755 1,774	1,330 1,442	1,803 1,730	1,604 1,633	1,326 1,484	1,747 1,501	1,666 1,534	1,553 1,619
South Africa ...	O. 1,500 S.C. 1,364	1,266 1,229	1,274 1,225	1,285 1,409	1,435 1,317	1,016 1,251	1,446 1,308	1,390 1,346	1,162 1,250	1,374 1,283	1,285 1,290	1,097 1,254
Scandinavia ...	O. 789 S.C. 844	834 839	921 883	906 957	1,116 1,059	886 983	1,066 1,065	1,107 1,031	1,041 1,045	1,205 1,118	1,307 1,217	1,019 1,150
Industrial Western Europe ...	O. 5,711 S.C. 5,197	4,906 4,872	5,093 4,850	4,836 5,200	5,935 5,837	4,773 5,070	5,780 5,713	5,558 5,271	4,868 5,346	5,653 5,355	5,290 5,283	5,073 5,493
United States ...	O. 2,029 S.C. 2,026	1,799 1,815	2,188 1,893	1,914 2,042	2,265 2,108	1,536 1,710	2,323 2,324	1,960 2,040	1,968 2,024	1,969 1,963	2,301 2,146	1,461 1,656
Canada ...	O. 1,420 S.C. 1,418	1,223 1,392	1,069 1,253	1,004 1,269	1,656 1,449	1,084 1,234	1,579 1,337	1,425 1,328	1,264 1,231	1,605 1,365	1,568 1,320	975 1,275
South America ...	O. 3,191 S.C. 3,031	2,901 2,841	3,033 3,014	2,497 2,820	2,936 2,990	2,377 2,502	3,107 2,692	3,089 2,829	2,263 2,522	2,546 2,483	2,569 2,617	2,419 2,581
Far East ...	O. 2,585 S.C. 2,317	1,728 2,141	1,348 1,614	1,230 1,879	1,792 2,405	1,322 1,495	2,141 1,910	1,851 1,698	1,105 1,555	1,323 1,574	1,412 1,444	1,371 1,423

O. : Original.

S.C. : Seasonally corrected.

TABLE XIII—EXPORTS OF U.K. PRODUCE AND MANUFACTURES TO OVERSEAS MARKETS. £ths. 1930
(As compiled from "Trade and Navigation Accounts of U.K.")

Overseas Market		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Australia	... O. ... S.C.	2,384 1,875	2,182 2,079	1,944 2,061	1,348 1,784	1,452 1,447	1,213 1,461	1,838 1,558	1,174 1,144	1,133 1,284	1,161 1,103	946 864	787 903
New Zealand	... O. ... S.C.	1,020 838	848 811	683 779	545 695	639 764	626 699	915 730	763 634	721 774	627 617	576 606	575 595
British India	... O. ... S.C.	4,524 3,733	4,614 3,947	4,598 3,669	3,489 3,049	3,433 3,509	1,966 3,062	2,728 2,750	2,015 1,979	1,493 2,206	1,725 1,893	1,787 1,934	1,602 2,247
British Colonies	... O. ... S.C.	1,543 1,498	1,215 1,388	1,466 1,374	1,217 1,267	1,181 1,200	1,112 1,224	1,221 1,148	957 986	1,173 1,331	1,134 888	987 855	903 969
South Africa	... O. ... S.C.	1,371 1,235	1,211 1,174	1,138 1,089	869 993	1,303 1,185	899 1,134	1,116 978	1,050 1,006	1,019 931	1,073 981	921 926	688 845
Scandinavia	... O. ... S.C.	999 1,054	963 968	989 951	926 977	975 918	757 854	876 875	906 830	824 828	893 806	845 755	702 833
Industrial Western Europe	... O. ... S.C.	5,486 4,972	4,586 4,552	4,807 4,564	4,157 4,521	4,284 4,186	3,766 4,063	4,378 4,311	4,067 3,780	3,735 4,213	4,133 3,835	3,940 3,933	3,246 3,666
United States	... O. ... S.C.	1,406 1,400	1,698 1,714	1,692 1,397	1,058 1,159	1,489 1,332	896 1,070	941 942	862 942	746 802	1,050 1,044	1,051 896	743 938
Canada	... O. ... S.C.	1,069 1,065	989 1,158	956 1,140	958 1,223	1,326 1,119	961 1,111	1,223 981	990 893	1,173 1,140	1,395 1,155	1,370 1,122	596 896
South America	... O. ... S.C.	2,604 2,444	2,415 2,355	2,062 2,043	1,797 2,120	1,937 1,991	1,986 2,111	2,429 2,014	2,190 1,930	2,153 2,412	2,035 1,972	1,794 1,842	1,873 2,035
Far East	... O. ... S.C.	1,595 1,327	1,163 1,476	889 1,255	694 1,343	798 1,411	777 950	926 695	791 638	629 1,079	552 803	547 579	750 802

O. : Original.

S.C. : Seasonally corrected.

COMPONENTS OF EXPORTS TO U.K. OVERSEAS MARKETS

AUSTRALIA

Class I : *E & F* Salt, cocoa preparations, spirits ; *G* Tobacco.

Class III : *B* Pottery, asbestos, cement ; *C* Pig iron, ferro alloys, iron bars, steel sections, strips, plates, tubes, railway materials, wire nails, etc., stoves, anchors and chains, bedsteads ; *D* Non-ferrous metals ; *E* Cutlery, scientific instruments ; *G* Machinery—agricultural, electrical, machine tools, prime movers, sewing, textile ; *I* Cotton yarns, piece goods, thread ; *J* Woollen and worsted yarns, manufactures, carpets ; *K* Silk manufactures ; *L* Linen manufactures, jute manufactures ; *M* Apparel—garments, haberdashery, boots and shoes, hosiery ; *Q* Paper and cardboard ; *R* Vehicles—Locomotives, cars, commercial vehicles, motor cycles, pedal cycles, rubber tyres and tubes, car parts ; *T* Linoleum, stationery.

Class IV : Animals living.

NEW ZEALAND

Class I : *E & F* Salt, cocoa preparations, spirits ; *G* Tobacco.

Class III : *B* Pottery ; *C* Iron bars, steel sections, strips, plates, tubes, railway material, wire, stoves ; *D* Non-ferrous metals ; *E* Cutlery ; *G* Machinery—agricultural, electrical ; *I* Cotton piece goods ; *J* Woollen and worsted manufactures, carpets ; *L* Linen and jute manufactures ; *M* Apparel—garments, haberdashery, boots and shoes, hosiery ; *Q* Paper and cardboard ; *R* Vehicles—cars, commercial vehicles, motor cycles, rubber tyres and tubes ; *T* Stationery.

BRITISH INDIA

Class I : *E* Biscuits and cakes, salt, beer and ale, spirits ; *G* Tobacco.

Class II : *A* Coal.

Class III : *B* Pottery, asbestos, cement ; *C* Iron bars, steel sections, strips, plates, tubes, railway material, wire, nails, etc., stoves ; anchors and chains ; *D* Non-ferrous metals ; *E* Cutlery, scientific instruments ; *G* Machinery—agricultural, electrical machine tools, prime movers, textiles ; *I* Cotton yarns, piece goods, thread, *J* Woollen and worsted manufactures ; *K* Silk manufactures ; *L* Linen manufactures ; *M* Apparel—garments, boots and shoes ; *O* Soap ; *Q* Paper ; *R* Vehicles—locomotives, cars, commercial vehicles, pedal cycles, rubber tyres ; *T* Misc.—polishes, stationery.

BRITISH COLONIES

Class I : *E & F* Salt, beer and ale, spirits, sugar refined ; *G* Tobacco.

Class II : *A* Coal.

Class III : *B* Cement ; *C* Steel sections, plates, tubes, railway material, wire ; *D* Non-ferrous metals ; *G* Machinery—prime movers ; *I* Cotton yarn, piece goods ; *L* Linen manufactures ; *M* Apparel—garments, boots and shoes ; *N* Chemicals ; *O* Soap ; *Q* Paper and cardboard ; *R* Vehicles—locomotives, cars ; *T* Misc.—stationery.

SOUTH AFRICA

Class I : *E & F* Cocoa preps., spirits.

Class III : *B* Pottery ; *C* Steel sections, plates, tubes, railway material, wire, nails, etc., stoves, anchors and chains, bedsteads ; *D* Non-ferrous metals ; *E* Cutlery ; *G* Machinery—agricultural, electrical, machine tools, prime movers ; *H* Wood manufactures ; *I* Cotton piece goods ; *J* Woollen and worsted manufactures, carpets ; *L* Linen manufactures, jute manufactures ; *M* Apparel—garments, boots and shoes ; *Q* Paper ; *R* Vehicles—locomotives, carriages, wagons, cars, motor cycles, pedal cycles, rubber tyres.

SCANDINAVIA

Class I : *E & F* Salt, sugar, refined.

Class II : *A* Coal.

Class III : *C* Steel sections, plates ; *D* Non-ferrous metals ; *I* Cotton yarn, piece goods ; *J* Wool tops, woollen and worsted yarns, manufactures ; *L* Linen manufactures ; *M* Apparel—garments, boots and shoes, hosiery ; *R* Vehicles—motor cycles, rubber tyres.

INDUSTRIAL WESTERN EUROPE

Class I : *E & F* Fish, cured or salted, beer and ale, spirits.

Class II : *A* Coal ; *F* Cotton waste ; *G* Wool (raw), wool (noils) ; *K* Hides and skins ; *N* Miscellaneous.

Class III : *B* Pottery, asbestos ; *C* Pig iron, ferro alloys, steel sections, plates, anchors and chains ; *D* Non-ferrous metals ; *E* Scientific instruments ; *G* Machinery—prime movers, textile ; *I* Cotton yarn, piece goods ; *J* Wool tops, woollen and worsted yarns, woollen and worsted manufactures, carpets ; *K* Silk manufactures ; *L* Flax and hemp yarn, linen manufactures, jute yarn and manufactures ; *M* Apparel—garments, boots and shoes ; *P* Leather and manufactures ; *R* Vehicles—motor cycles, pedal cycles, rubber tyres ; *T* Misc.—polishes, stationery.

Class IV : Horses.

UNITED STATES

Class II : *A* Coal ; *F* Cotton waste ; *G* Raw wool, wool noils ; *K* Hides and skins ; *L* Paper making.

Class III : *B* Pottery, asbestos ; *C* Pig iron, ferro-alloys, steel sections, plates, wire ; *D* Non-ferrous metals ; *E* Cutlery, scientific instruments ; *G* Textile machinery ; *H* Wood and timber manufactures ; *I* Cotton yarn, piece goods ; *J* Woollen and worsted manufactures, carpets ; *K* Silk manufactures ; *L* Flax and hemp yarn, linen manufactures, jute manufactures ; *M* Apparel—garments, boots and shoes, hosiery ; *P* Leather and manufactures ; *Q* Paper ; *T* Misc., stationery.

CANADA

Class I : *E & F* Spirits.

Class II : *A* Coal ; *G* Raw wool.

Class III : *B* Pottery ; *C* Pig iron, iron bars, ferro alloys, steel bars, plates, wire, anchors ; *D* Non-ferrous metals ; *E* Cutlery ; *G* Machinery—electrical, prime movers ; *I* Cotton yarn, piece goods ; *J* Wool tops, woollen and worsted yarns, woollen and worsted manufactures, carpets ; *K* Silk manufactures ; *L* Linen manufactures, Jute manufactures ; *M* Apparel—garments, boots and shoes, hosiery ; *P* Leather and leather manufactures ; *Q* Paper and cardboard ; *T* Misc.—stationery.

Class IV : Animals.

SOUTH AMERICA

Class II : *A* Coal.

Class III : *B* Pottery, cement ; *C* Steel sections, plates, tubes, railway material, wire, stoves ; *D* Non-ferrous metals ; *E* Cutlery ; *G* Machinery—agricultural, electrical prime movers, sewing machines, textile machinery ; *I* Cotton yarn, piece goods, thread ; *J* Woollen and worsted manufactures, carpets ; *K* Silk manufactures, *L* Linen manufactures, jute manufactures, and yarns ; *R* Vehicles—locomotives, carriages, wagons, tyres.

FAR EAST

Class I : *G* Tobacco.

Class II : *C* Iron ore and scrap.

Class III : *C* Steel sections, plates, tubes ; *G* Machinery—electrical, textile ; *I* Cotton yarn, piece goods ; *J* Wool tops, woollen and worsted yarns and manufactures ; *L* Linen manufactures ; *N* Chemicals—sulphate ; *O* Soap ; *Q* Paper and cardboard ; *R* Vehicles—pedal cycles

TABLE XIV—EXPORTS OF U.K. PRODUCE AND MANUFACTURES BY COMMODITY GROUPS
(Original figures in £ths.). 1928

Commodity Group	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Producer Goods (Raw Materials)...	17,522	17,548	19,742	17,007	19,057	18,819	16,726	18,534	15,359	19,112	18,878	17,594
Producer Goods (Durable) ...	7,784	6,781	8,584	8,018	7,014	8,157	8,785	7,070	8,471	7,670	7,720	8,788
Consumer Goods (Non-Durable)	28,871	27,772	31,108	25,115	26,154	26,379	29,408	30,913	27,497	30,966	30,199	26,916
Consumer Goods (Durable) ...	4,104	3,896	4,464	4,005	4,455	4,516	4,169	4,014	3,578	4,566	4,863	4,372
Total Class I, II and III ...	58,311	55,997	63,893	54,145	56,680	57,871	59,088	60,531	54,905	62,314	61,660	57,670
Class IV—Animals Living ...	196	149	92	106	114	217	238	183	140	157	172	231
Class V—Parcel Post ...	1,236	1,089	959	1,021	1,767	1,385	1,568	1,503	1,576	1,825	1,934	2,499
Total Exports ...	59,743	57,235	64,949	55,272	58,561	59,473	60,894	62,217	56,621	64,296	63,766	60,400
Rounding Error ...	0	-1	-9	+4	+7	+1	+9	0	+1	-17	-1	+6
Total Exports (Official) ...	59,743	57,236	64,958	55,268	58,554	59,472	60,885	62,217	56,620	64,313	63,767	60,394
Seasonally corrected figures.												
Producer Goods (Raw Materials)...	16,653	18,282	18,910	17,662	17,270	19,869	16,559	19,074	17,152	17,782	18,299	18,471
Producer Goods (Durable) ...	7,718	8,135	8,150	7,406	6,559	8,356	7,974	7,585	9,032	7,636	7,554	8,739
Consumer Goods (Non-Durable)	26,831	28,024	30,244	27,290	26,656	30,224	27,282	29,068	28,253	28,988	29,224	29,339
Consumer Goods (Durable) ...	3,860	4,068	4,369	4,222	3,885	4,809	3,922	4,288	4,204	4,243	4,507	4,617
Total Exports ...	56,271	60,096	63,230	58,238	56,293	65,121	57,533	61,882	60,456	60,675	61,400	58,559

TABLE XV—EXPORTS OF U.K. PRODUCE AND MANUFACTURES BY COMMODITY GROUPS
(Original figures in £ths.). 1929

Commodity Group	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Producer Goods (Raw Materials)...	20,141	17,001	18,473	18,368	22,175	16,518	19,874	18,267	17,311	20,371	20,018	17,549
Producer Goods (Durable) ...	9,191	6,210	8,025	9,263	9,242	6,147	8,501	8,226	6,988	8,199	7,448	8,448
Consumer Goods (Non-Durable)	30,577	26,665	26,677	27,149	28,780	21,925	31,456	30,579	25,474	29,260	28,602	25,614
Consumer Goods (Durable) ...	4,797	4,043	4,157	4,142	5,591	3,776	4,995	4,346	3,699	5,039	5,131	4,121
Total Class I, II and III ...	64,653	53,919	57,279	58,922	65,788	48,366	64,826	61,418	53,472	62,869	61,199	55,732
Class IV—Animals Living ...	201	97	98	94	181	199	308	164	133	188	154	208
Class V—Parcel Post ...	1,963	1,644	1,194	1,228	1,466	1,327	1,383	1,459	1,508	1,528	1,779	2,489
Total Exports ...	66,870	55,660	58,624	60,244	67,435	49,892	66,517	63,041	55,112	64,585	63,132	58,429
Rounding Error ...	-10	-5	+1	0	-2	-1	-3	-4	+8	-4	+7	-1
Total Exports (Official) ...	66,880	55,665	58,623	60,244	67,437	49,893	66,520	63,045	55,104	64,589	63,125	58,430
Seasonally corrected figures.												
Producer Goods (Raw Materials)...	19,234	17,735	17,641	19,023	20,388	17,568	19,707	18,807	19,104	19,041	19,439	18,471
Producer Goods (Durable) ...	9,125	7,564	7,591	8,651	8,787	6,346	7,690	8,741	7,542	8,165	7,282	8,399
Consumer Goods (Non-Durable)	28,537	26,917	25,813	29,324	29,282	25,766	29,258	28,734	26,230	27,282	27,627	27,992
Consumer Goods (Durable) ...	4,553	4,215	4,062	4,359	5,021	4,069	4,748	4,620	4,325	4,716	4,775	4,366
Total Exports ...	63,408	58,525	56,895	63,214	65,176	55,542	63,168	62,710	58,940	60,951	60,758	56,595

TABLE XVI—EXPORTS OF U.K. PRODUCE AND MANUFACTURES BY COMMODITY GROUPS
(Original figures in £ths.). 1930

Commodity Group	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Producer Goods (Raw Materials) ...	18,061	15,666	16,378	14,439	15,590	12,658	14,727	12,086	12,142	14,364	12,395	11,372
Producer Goods (Durable) ...	6,877	6,580	8,306	8,147	8,679	8,649	8,674	6,664	6,341	7,697	8,773	6,331
Consumer Goods (Non-Durable)	27,106	24,593	23,945	19,700	21,402	17,365	22,204	19,939	20,011	20,310	18,076	15,595
Consumer Goods (Durable) ...	4,132	3,805	3,886	3,386	3,801	2,935	3,604	2,807	2,794	3,274	2,946	2,604
Total Class I, II and III	56,176	50,644	52,515	45,672	49,472	41,607	49,209	41,496	41,288	45,645	42,190	35,902
Class IV—Animals Living ...	194	100	68	121	111	129	187	124	113	108	90	157
Class V—Parcel Post ...	1,888	1,176	1,363	1,053	1,429	1,112	1,344	1,162	1,350	1,171	1,774	2,411
Total Exports ...	58,258	51,920	53,946	46,846	51,012	42,848	50,740	42,782	42,751	46,924	44,054	38,470
Rounding Error ...	-4	-4	0	-15	0	+3	-6	+5	+10	+2	-3	+12
Total Exports (Official) ...	58,262	51,924	53,946	46,861	51,012	42,845	50,746	42,777	42,741	46,922	44,057	38,458
Seasonally corrected figures.												
Producer Goods (Raw Materials) ...	17,154	16,400	15,546	15,094	13,803	13,708	14,560	12,626	13,935	13,034	11,816	12,294
Producer Goods (Durable) ...	6,811	7,934	7,872	7,535	8,224	8,848	7,863	7,179	6,902	7,663	8,612	6,282
Consumer Goods (Non-Durable)	25,066	24,845	23,081	21,875	21,904	21,206	20,006	18,094	20,767	18,332	17,101	15,973
Consumer Goods (Durable) ...	3,888	3,977	3,791	3,603	3,231	3,228	3,357	3,081	3,420	2,951	2,590	2,849
Total Exports ...	54,790	54,784	52,218	49,831	48,751	48,494	47,394	42,442	46,577	43,284	41,690	36,623

COMMODITY DIVISION OF TOTAL EXPORTS

I. CONSUMER GOODS (NON-DURABLE)

Class I : Food, Drink and Tobacco ; A Grain and Flour ; B Meat ; D Animals, living, for food ; E & F Other Food and Drink ; G Tobacco.

Class II : A Household coal.

Class III : E Needles ; F Batteries ; I Cotton piece goods ; handkerchiefs ; thread ; small-wares ; J Woollen and worsted tissues ; other woollen and worsted manufactures ; K Silk manufactures ; L Art. silk tissues ; embroidery ; linen manufactures ; jute manufactures ; M Apparel ; N Drugs and medicines ; O Petroleum ; soap ; varnish ; wax ; oils ; candles ; Q Writing paper ; stationery ; other ; R Rubber tyres ; S Rubber manufactures ; T Ammunition ; books ; brooms ; buttons ; gelatine and glue ; lamps ; pipes ; polishes ; stationery ; toys ; umbrellas.

(Used mainly by producers)

Class III : B Refractories ; other ; C Nuts and bolts ; wire ; other ; F Electric wire and cables ; I Cotton cleaning waste ; L Jute sacks ; N Paints ; P Leather machinery belting ; T Other machinery belting.

II. CONSUMER GOODS (DURABLE)

Class III : B Pottery ; glassware ; C Stoves ; bedsteads ; holloware ; E Cutlery ; hardware ; horticultural tools, files ; scientific instruments ; clocks and watches ; G Sewing machines and parts ; typewriters ; H Furniture and cabinet ware ; other wood manufactures ; J Carpets ; R Cars ; car parts ; motor cycles ; pedal cycles ; other ; T Linoleum ; furs ; jewellery ; musical instruments ; sports goods ; L Jute carpets.

III. PRODUCER GOODS (RAW MATERIALS)

Class I : B Animal feeding stuffs.

Class II : A Coal ; B Other non-metal mining and quarry products (mainly china clay) ; C Iron ore and scrap ; E Wood and timber ; F Raw cotton and waste ; G Raw wool and waste ; H Raw silk ; I Other textile materials ; J Seeds and nuts for oil ; K Hides and skins ; L Paper making materials ; M Rubber ; N Miscellaneous.

Class III : A Coke and manufactured fuel ; B Asbestos manufactures ; cement ; C Semi-manufactured iron and steel ; D Non-ferrous metals ; I Cotton yarns ; J Wool tops ; woollen and worsted yarns ; other hair and wool ; K Silk yarns ; L Art. silk yarns ; flax and hemp yarns ; jute yarns ; N Chemicals ; dyestuffs ; P Leather ; Q Paper (Print) ; T Fertilisers.

IV. PRODUCER GOODS (DURABLE)

Class III : C Railway material ; anchors ; E Engineers tools ; F Electric lamps ; telegraph instruments ; electrical instruments ; electrical goods and apparatus (other) ; G Machinery, agricultural ; boilers ; cranes ; electrical generators ; grain milling ; machine tools ; sugar making ; prime movers (not electric) ; paper making ; printing ; pumps ; textile ; G Wood working ; other ; R Vehicles Group—Aircraft ; locomotives and parts ; carriages ; wagons ; commercial vehicles (motor) ; vessels (ships) ; commercial vehicles (parts) ; other parts not specified.

Patterns of Development in Newly Settled Regions

I.

To aid in the formulation of effective development programs, economists must seek to understand the reasons why certain parts of the "backward" world have become enmeshed in what appears to be a vicious circle of poverty. Why is it that these particular regions failed to become economically developed? ¹

One economic relation which may be useful for answering some aspects of this question is the input-output variation among commodity production functions. Although everyone is aware that there are significant differences among commodities concerning the nature of the physical output possibilities from different quantities and combinations of the factors of production—as witness the frequent use of such terms as "labor intensive" and "capital intensive" commodities—these engineering differences among production functions only infrequently have been made an operational part of economic theorizing. By far, the most comprehensive use of these differences for economic analysis is the input-output studies initiated by Professor Leontief.² He has measured the average technical input coefficients employed in producing the outputs of various industries in the United States. These coefficients include both current or flow coefficients, *i.e.*, the quantities of various products (measured in dollars) and the number of workers (or man-years) which are used to produce a dollar's worth of a particular commodity per year, and capital or stock coefficients, *i.e.*, the quantity of capital (measured in dollars) used to produce a dollar's worth of a commodity per

¹See Haavelmo, T., *A Study in the Theory of Economic Development*, No. III in the series *Contributions to Economic Analysis*, Amsterdam, 1954, pp. 1-6, for an excellent discussion of the objectives and possibilities of a theoretical approach to the problem of economic development.

²W. W. Leontief, *The Structure of the American Economy, 1919-1939*, New York, 1951. Also W. W. Leontief and others, *Studies in the Structure of the American Economy*, New York, 1953.

year. On the basis of these coefficients it is possible to estimate the derived demands which would arise from various changes in the final bill of goods.

Table I presents a few of the Leontief labor and capital coefficients. The figures in Table II are rough estimates of the labor coefficients for a few agricultural commodities that are produced to an important degree under a plantation system.

TABLE I
LABOR AND CAPITAL REQUIREMENTS
FOR SELECTED UNITED STATES INDUSTRIES
PER \$1,000 OF OUTPUT, 1947 * †

	Capital (dollars)	Labor (man years)
Agriculture and fisheries	2524·4	·082
Textile mill products	493·6	·110
Chemicals	592·7	·049
Iron and steel	1026·3	·077
Agriculture, mining and construction machinery	838·6	·087
Motor Vehicles	565·8	·060
Coal, gas and electric power	2222·6	·099
Railway transportation	3343·3	·153
Trade	984·9	·165
Communications	4645·4	·163

* Leontief, Wassily, "Domestic Production and Foreign Trade; The American Capital Position Re-examined," *Proceedings of the American Philosophical Society*, Vol. 97, No. 4, September, 1953.

† Two other important studies dealing with inter-industries differences among capital-output ratios in the United States are: D. Creamer, *Capital and Output Trends in Manufacturing Industries, 1880-1948*, Occasional Paper 41, National Bureau of Economic Research, New York, 1954, and I. Borenstein, *Capital and Outlay Trends in Mining Industries, 1870-1948*, Occasional Paper 45, National Bureau of Economic Research, 1954.

TABLE II
SELECTED LABOR COEFFICIENTS IN TEA,
RUBBER, AND SUGAR

Tea * (1940 Colombo price)				
Ceylon	...	...	...	6.0-6.3 men per \$1,000 per year
Rubber † (1939 Singapore price)				
Malaya and F.M.S. estates	...	...	...	2.6-4.0 men per \$1,000 per year
Ceylon (estate and total)	...	...	...	4.2-5.7 men per \$1,000 per year
Sugar ‡ (cane)				
Cuba (1939 Cuban price)	...	...	...	2.1 men per \$1,000 per year
Hawaii (1939 New York price)	...	...	...	.6 men per \$1,000 per year
Or (1939 Cuban price)	...	...	...	1.1 men per \$1,000 per year

* The sources for these figures are *The Census of Ceylon, 1946, Vol. I, Part 1* (6.3 per \$1,000); *The Annual General Report for 1934 on the Economic, Social, and General Conditions of the Island, 1934-1936*, (6.0 per \$1,000); and V. D. Wickizer, *Coffee, Tea and Cocoa* (6.3 per \$1,000 on the basis of information on p. 162 and his yield figures). It is interesting to note that using the real labor coefficient for India in 1915 (*Report of the Production of Tea in India, 1915*, Calcutta, 1916) together with the 1940 Colombo price gives a coefficient of 8.9 per \$1,000.

† This information was obtained from P. T. Bauer, *The Rubber Industry*, pp. 266-267, (Malayan estates, July, 1940 to June, 1941—2.6 per \$1,000; F.M.S. estates, 1933—2.6 per \$1,000; F.M.S. estates, 1929—4.0 per \$1,000); *Census of Ceylon, 1946* (total exports 1946—5.7 per \$1,000); and *The Annual General Report* (4.2 per \$1,000).

‡ The sources are: U.S. Cuban Sugar Council, *Sugar—Facts and Figures, 1952*, (total production, 1950—2.7 per \$1,000); *Printed Reports of the 68th Annual Meeting of the Hawaiian Sugar Planters' Association, 1948*, (total production of these companies, 1939—.6 or 1.1 per \$1,000).

These coefficients are, of course, average figures. Even within the United States intra-industry differences are important because of variations in the techniques employed within an industry, differences among factor price ratios, dissimilarities in the quantity of the labor supply and natural resource conditions, differences in managerial skill, etc. For similar reasons, one would expect a wide degree of intra-industry variability among different countries.¹ However, if new firms, using the same technological and managerial

¹Information on some of the international differences in capital-output ratios has been collected by Grosse, R. N., "The Structure of Capital," in Leontief, W. W., *Studies in the Structure of the American Economy*, New York, 1953; Bhatt, V. H., "Capital-output Ratios of Certain Industries: A Comparative Study of Certain Countries," *Review of Economics and Statistics*, Vol. XXXVI, No. 2, August, 1954; and Mandelbaum, K., *The Industrialization of Backward Areas*, Monograph No. 2, Institute of Statistics (Oxford University), Oxford, 1947.

knowledge, were established in the various industries and their means of production were secured from some common, perfectly competitive factor market, Professor Leontief's investigations do seem to indicate that there would be significant industry differences among the labor and capital coefficients employed in these firms.¹

While the Leontief analysis assumes fixed production coefficients for each industry, this assumption will not be followed here, since the analysis will be conceptual rather than statistical. What will be assumed is merely that there are significant engineering differences among some commodity production functions over their input-output range. These variations concern the manner in which returns to scale behave for different factor ratios and also the manner in which the maginal rates of factor substitution vary for different output levels and factor ratios.

II.

This paper will utilize the concept of these production function differences in analyzing the problem of differential rates of growth between newly settled regions. While technological conditions of production influence the pattern of growth in an economy at all stages of development, it appears that they can be particularly important in conditioning the potential for growth in newly settled regions. Consequently, the procedure to be followed will be to contrast the *hypothetical* development of two regions—both of which, initially, are assumed to be sparsely populated. The two areas are assumed to develop simultaneously within a given and constant state of technology and to draw their immigrants and capital from some common, populated region where all the inputs and outputs are represented.² The socio-political environment of this more populated region is assumed to be conducive to the development of the two sparsely populated regions.

¹The coefficient of variation of the capital-output ratios in 1929 prices in thirty-seven manufacturing industries analyzed by Creamer, D., *op. cit.*, for 1948 was 30.7%. However, the coefficient has declined steadily from 1900, when it was 66.9%.

²The effects of improvements in technological knowledge will be discussed later. In a general sense, the exploitation of these new regions may be considered a technological change.

Each region's economy is assumed to be small enough in its early stages of development to have no effect on the given hierarchy of factor and commodity prices prevailing in the more developed, third region.¹ Furthermore, the two regions are equi-distant from the older area and this distance is sufficiently great to make the costs of labor migration fairly substantial. It also is assumed that the economic development of each of the two sparsely populated regions begins in the export sector with the production of a primary commodity.

The differences between the two regions concern their natural resource conditions. One of the regions is assumed to possess a soil and climate highly suitable for the initial cultivation of a plantation crop in contrast to the other area which is assumed to enjoy conditions most conducive to the initial production of a non-plantation type commodity such as wheat. However, in both regions there is assumed to be an abundant supply of mineral resources such as coal, iron-ore, ferro-alloys, oil, etc. These are not exploited immediately since, initially, they are at a prohibitive distance from the export ports.

The purpose of most of these assumptions is to minimize differences among the many other factors which can cause dissimilarities between the two regions in their patterns of development. The development model to be analyzed can easily be compared with the differential growth patterns which might result by varying these initial assumptions. Some of the consequences of such other assumptions will be examined later. However, it seems that even with a wide range of possible initial conditions facing newly settled areas the effects of production function differences still emerge as an important (and neglected) determinant of development patterns.

Given the above conditions, the contention here will be that the extent to which the export sector induces the subsequent development of other sectors in the two economies depends to an important degree upon the technological nature of the production function of the export commodity (assuming there is only one major export item in each new region). For, given the price of the export commodity and the array of

¹The labor supply is divided into a number of imperfectly competing groups.

factor prices in the third region, this function will greatly affect subsequent development by initially influencing the nature of the labor and capital supply which flows into each region and the distribution of each economy's national income. It is from this framework that some of the many other important factors which determine the pattern of development will be introduced into the analysis.

Assume that the following conditions exist in one of the two regions. Factor and commodity prices in the populated area and the climate and soil of the new region indicate that the most profitable opportunity for initial development is the production of a plantation type commodity. Assume the production function for this particular commodity is such that for a wide range of labor/capital price ratios the most efficient organization for any level of production is on a relatively labor intensive basis.^{1,2} In other words, efficient production of a dollar's worth of the commodity technologically tends to require a relatively large number of laborers to perform comparatively simple tasks. Beyond a certain proportion of capital to labor, the amount of capital which must be substituted for a given decrease in labor in order to maintain a given level of output is relatively large. Furthermore, there are significant increasing returns to scale in the cultivation and processing of the commodity. Consequently, comparatively large amounts of both capital and labor are necessary for the most efficient size of the production unit. A high level of managerial and technical skill also is needed to direct large plantations effectively.

Small, family-size farms are attractive for the very low income groups in the older region, but the independent entrance of these groups is prevented by the cost of migration and the initial capital outlay on even this type of small productive unit. Nor are these people able to borrow the funds in the capital

¹Since information concerning the variability of capital coefficients among agricultural commodities is meager, it will be assumed that optimal capital requirements per dollar of output are about the same for the two types of agricultural commodities discussed here.

²For a general survey of the methods of production for a few plantation type products, see V. D. Wickizer, *op. cit.*; A. Pim, *Colonial Agricultural Production*, London, 1946; P. T. Bauer, *op. cit.*; and C. R. Fay, "The Plantation Economy," *Economic Journal*, 1936.

market, since severe capital rationing tends to operate against these very low income groups.

Those establishing productive units migrate from middle and higher income groups of the developed region and either possess the necessary funds for migration or are able to borrow them in the capital market. In order to produce the commodity at the lowest possible costs, these entrepreneurs in turn create a demand in the older region for the labor of very low income groups (who are assumed to possess the requisite skill to perform the comparatively simple tasks involved in production or can be trained easily to perform them). Plantation owners or their agents seek out these low wage groups and finance their migration. And they protect this investment by attempting to tie the workers to the plantations for a certain number of years.

In the second sparsely populated region assume the following conditions hold. Prices in the older area and the environment of the new region favor the development of a non-plantation agricultural commodity. The production function for this commodity differs from the plantation commodity in two respects. First, a family-size farm gives an efficient scale of production. In particular, large scale production based on the intensive use of cheap, imported labor is not the best form of economic organization. Furthermore, the absolute amount of capital required is less for the optimum size of a production unit, and the level of managerial and technical skill need not be so high for a productive unit of the most efficient size. Secondly, the technological possibilities of capital intensification on the family-size farm are much greater. Varying the labor/capital price ratios over a wide range causes much more factor substitution in producing a given level of output than with the plantation crop.

As in the previous case, the very low income groups in the older region tend to be prevented from independent migration because of the costs of migration and the difficulty of borrowing funds. The level of knowledge and skill required for establishing a farm also rules out the migration of many from this labor group. Because of the assumed distance conditions, financing the movement of this type of labor is relatively costly. This

fact and the wide range of alternative factor combinations prevent any extensive importation of cheap, unskilled labor by small-scale cultivators. Consequently, migrants flow from the income groups which can provide the necessary initial outlays on transportation and production. However, capital rationing also works against the latter group to some extent. The smaller scale of operations hampers the supervision of direct lending. Consequently, direct inter-regional lending is not as significant as in the plantation economy.

The agricultural development in both regions stimulates a simultaneous development of some supporting industries—such as transportation—which are directly linked with exporting the agricultural commodity.¹ The large amount of capital necessary for even a minimum amount of this type of social capital is supplied comparatively readily by foreign investors. Not only are these industries directly tied to the exchange-earning export industry and, consequently, are particularly attractive to foreign investors, but also they are organized on a large enough scale to take advantage of the established capital markets in the developed region.

III.

However, the obstacles to the vigorous expansion of the plantation economy into a developed, higher per capita income economy are much greater than with the non-plantation economy. The relevant factors for an analysis of the development potential of the two regions from the stage already discussed can be grouped into demand and supply forces. First, in order to introduce domestic production of commodities for which an export advantage does not exist, there must be the basis of an internal demand for such products. And, secondly, given the demand, the natural resource situation and the supply of capital and labor must be adequate enough to meet foreign competition.

¹See Nurkse, R., "The Problem of International Investment Today in the Light of Nineteenth-Century Experience," *The Economic Journal*, December, 1954.

For both regions the composition of the family budget is assumed to depend upon the level of income.¹ At very low levels, the budget consists almost entirely of a few basic foodstuffs, clothing, household needs and shelter. As incomes rise, the food budget is diversified and, eventually, a smaller proportion of the budget consists of foodstuffs. Durable consumer good expenditures and savings increase in relative importance.

In the plantation economy at this initial stage a large part of the population is in the very low income brackets. Consequently, most of this group's effective demand consists of a few basic foods, simple clothing and other consumer durables, and minimum shelter needs. While production of the plantation crop requires large quantities of labor, this labor is not needed throughout the entire year. Consequently, workers lease small plots of land from the plantation owners (who also usually provide the capital) and supplement their income by growing part of their food requirements. During the idle period, the choice to a laborer of working more on the plantation and less for himself does not exist. The alternative essentially is between leisure and working for himself. And since his plantation income is very low, his marginal utility for commodities is relatively high. Therefore, he is willing to devote much of his free time to growing part of his own food in a very socially inefficient manner. He drives his marginal productivity in this line down to nearly zero. The same phenomenon tends to take place with respect to part of his clothing, shelter, and durable consumption goods needs. The family unit produces many of these items.²

¹K. Mandelbaum in *The Industrialization of Backward Areas*, Oxford University, Institute of Statistics, Monograph No. 2, Oxford, 1947, utilizes a budget approach in estimating the flow of demand in his hypothetical model of development for south-eastern Europe. He also employs capital, labor, and commodity coefficients in computing the supply requirements for his program. Because of a lack of data, this procedure so far has been only used in a rough fashion for the formulation of actual development plans in the backward countries.

²For a general discussion of some of the production and labor conditions in such backward areas, see Greaves, I. C., *Modern Production among Backward Peoples*, London, 1935, and Moore, W. E., *Industrialization and Labor*, Ithaca, 1951.

Why do not the plantation workers break away from the plantation, produce the crop themselves, and raise their income level appreciably above the plantation wage? Some do break away. However, most of these unskilled, low income workers cannot save or borrow enough to start anything but a very small, low income yielding unit of production.

In attempting to expand from such small units, the cultivators are hampered by the technical constraints of the crop's production function. They must secure more labor, land, and capital, *i.e.* expand horizontally, for efficient production. But this is very difficult. First, the initial income level on these farms is so low that their saving is almost insignificant. Nor are they able to borrow sufficient funds for a large scale unit. Secondly, it is difficult for this group to enlarge gradually its holdings of good land. The fertile land is cultivated by the plantation method and its owners are reluctant to sell or lease parcels of it. Large tracts must be taken at one time. But the small farmers cannot overcome this discontinuity. The best they can do is obtain isolated parcels of good land or more contiguous but relatively poor land. However, expanded production on this type of land is not very efficient. Thirdly, the level of knowledge and skill of these people is so low that they are not capable of supervising and controlling the greater amounts of capital and labor necessary for increased production. The supervision of the labor is particularly important. It is probably more difficult to direct the greater amount of non-family labor than the increased quantity of capital. Finally, the plantation class tends to develop a social antipathy towards this very low income group. It does not want the group to move into the plantation class and erects social and economic barriers in the path of the group's expansion.

All of these factors tend to prevent this group from increasing the size of its farms and thus its income level. And, because production of the crop does not require the same amount of labor throughout the entire year, these small farm families (like the plantation workers) also grow part of the food they consume (or even a market supply) and produce many of the durable consumer goods they consume. Disguised unemployment tends to arise within this sector of the economy.

Small scale planters who employ some non-family labor are another important group in the economy. These individuals either break through the exclusively family-labor type of farming or initially possess sufficient funds to establish a small plantation. They resemble somewhat the middle income migrants in the other region. However, these planters face more difficulties in reaching the optimum productive unit. In the first place, they must accumulate much more capital to attain this level. And, as in the non-plantation area, the capital rationing barrier forces the planters to rely on current saving for most of their investment funds. Furthermore, given funds equivalent to the requirements for the smaller optimum size farm in the other region, a small scale planter will not earn as high an income as his counterpart in the other region. The production unit is too small. Even if organized as efficiently as possible, he cannot use his managerial skill to full advantage. Merely directing production does not require his full time nor yield a very high income. Yet the only alternative to leisure is to perform the low productivity tasks of the hired help. Consequently, because of their low income level, these planters cannot expand their productive units as rapidly as the farmers of the non-plantation region. In addition, most of these small planters do not possess the high degree of managerial ability and technical skill required to expand the scale of operations in an optimum manner. Consequently, they tend to keep the amount of labor and land employed about the same and reinvest their savings in capital improvements which do little in lifting their level of income, because of the nature of the crop's production function.

A reasonably stable hierarchy of export producers emerges within the economy. At one end stand the plantations employing large quantities of low wage labor. The other end of the scale is composed of many small, family cultivators who operate under a tenure system or perhaps own their land. The income level of these farmers is not much higher than the plantation wage, and the possibilities for expansion by these producers is not favourable. The small scale planter who combines family and hired labor lies between these two groups. While incomes among these planters are higher than the very

small farmers, they are below the level achieved with a similar investment in the non-plantation economy.

Perhaps 70 per cent. of the economy's income is spent on foodstuffs.¹ The remainder is devoted to services, consumer durables (of which expenditures on items other than simple clothing and household articles are a small percentage), and saving. The effective market demand for the higher class of consumer goods and services stems largely from the middle and high income groups, who are composed of large plantation owners, those performing the marketing services associated with the export item, and to some extent the small planters. A large number of these commodities are imported from the more developed region.

Why do not efficient domestic industries quickly develop and capture both the import markets and the domestic markets which are supplied in a socially inefficient manner?

Consider the opportunities in the fields of simple, mass consumed durables and luxury durables—many of which are imported. A major obstacle confronting prospective domestic manufacturers is the problem of training the labor force to the factory system. The large, low income labor supply possess such a low level of education and skill that its costs of training represent a large, initial outlay. While there is always the alternative of recruiting skilled foreign labor, this too is expensive. At this early stage of development, the region cannot rely to any significant extent upon the voluntary migration of suitable labor. This labor migrates at its own expense only after the industrial sector has begun to expand vigorously and employment opportunities become well known. In addition, although the marginal productivity of the low income farm labor may be near zero, it is necessary to offer them a higher figure in order to induce them to move into urban factories. Both of these factors make it difficult to capture the import market.

They are particularly forceful with respect to luxury imports. Many of these items require a very high degree of labor skill. Conspicuous consumption also applies to some of

¹T. W. Schultz, *The Economic Organization of Agriculture*, New York, 1953, Ch. 4.

these goods, and considerable outlays on advertising are necessary to overcome a preference for foreign commodities. Still another important factor with respect to some of these consumer durables is the internal and external economies involved in their production. The domestic market is too small to take advantage of these economies.

Most of these obstacles also apply to those consumption items produced on a household scale. However, another obstacle confronting more efficient domestic industry is one which prevents the importation of these items, namely, the high costs of internal transportation and the lack of other marketing facilities. In this region, the bulk of the population in the hinterland is so poor that the construction of transportation facilities (other than the minimum necessary for the export crop) proceeds very slowly. Governments cannot raise enough revenue from these people to build adequate facilities. The higher income groups are so spread out that they cannot support these facilities either. To obtain many of the commodities and services, which they desire, they travel to a few large cities where the marketing facilities for the export commodity are located. Outside of these central cities, few other trading cities spring up and, consequently, transportation facilities in the interior remain crude. Therefore, domestic manufacturers find it too expensive to tap the interior markets for mass consumption goods.

Two other factors on the supply side, which are relevant to this discussion, are the rate of saving and the supply of entrepreneurial labor. Because of the greater income inequality the proportion of saving to national income is likely to be higher in this region than in the non-plantation economy. However, a larger share of the saving flows back to the more developed area in the form of interest and dividend returns on foreign investments in the plantations and the auxiliary service industries. The foreign earnings which are retained tend to be employed for a further expansion of the export industry, since foreign investors prefer investments which are directly linked with the foreign exchange earning ability of the economy. Furthermore, foreign investments in industries producing for an internal demand are discouraged by the lack of

an adequate market in addition to the other factors already enumerated. For the same reasons, large domestic savers also tend to employ their funds in the export and import trades or in such ventures as residential and business construction. But, because of the nature of the production function for the export crop, investment in this sector does little to improve the distribution of income; it merely enlarges the existing productive structure as more cheap labor is imported.¹ Nor does the investment in elaborate homes, office buildings, shops, etc. do much in inducing a better pattern of growth. With respect to entrepreneurship, the most obvious source of leadership for manufacturing—the large plantation owners—provides a meager supply. This group, because of the unique non-pecuniary advantage of the plantation life, tends to develop a social antipathy towards occupations in the manufacturing field. And, the low income group possesses neither sufficient training nor the social and economic opportunities necessary to provide more than the occasionally successful entrepreneur.

All of these factors tend to restrain the economy from breaking out of its predominantly export-oriented nature.² As transportation facilities improve, the mineral resources are tapped, but this sector too becomes export-oriented. Domestic manufacturing industries based on these raw materials are blocked by the same obstacles previously mentioned. The only real possibility for exploiting the minerals is as raw material, export industries. And, because of the general lack of technological and entrepreneurial skill within the economy, many of the firms are owned and operated by foreigners. Although these industries may provide an important source of saving in the form of royalty payments and, depending on the

¹W. A. Lewis employs the assumption of an elastic labor supply in his interesting article, "Economic Development with Unlimited Supplies of Labour," *The Manchester School of Economic and Social Studies*, May, 1954.

²See Mosk, S. A., "Latin America versus the United States," *The American Economic Review*, Papers and Proceedings, May, 1951, for a discussion of some of the development obstacles in this kind of economy; H. W. Singer, "The Distribution of Gains between Investing and Borrowing Countries," *The American Economic Review*, Papers and Proceedings, May, 1950. Also on the general topic of the effect of foreign trade on newly settled areas see H. Myint, "The Gains from International Trade and the Backward Countries," *The Review of Economic Studies*, No. 58, 1954–1955.

quality of labor they require, may help to improve the distribution of income, these effects will not be as favourable for growth as those that would result if the internal market were large enough to induce related domestic manufacturing industries.

IV.

When the development potential in the other region is analyzed, a more optimistic outlook appears. The nature of the export crop's production function is an important reason for this view. As already mentioned, labor and capital requirements for an optimum size farm in this region are much smaller than for the plantation type commodity. The family unit gives an efficient scale of operations. As in the other region, the very low income families in the older regions are excluded from independent emigration by the relatively high costs of the movement. However, unlike the plantation region, the more wealthy individuals do not finance their passage, since very unskilled labor cannot be employed as effectively in this type of agriculture. Instead, most of the migrants come from the income groups which possess sufficient funds for migration. In this region there are relatively fewer individuals at both ends of the absolute income scale.

Unlike the plantation economy, as this region's export sector expands, the economy does not devote a large portion of its investment to securing and supporting a greater quantity of cheap, unskilled labor. Although many of the migrants to this region originally do not establish the most efficient size unit, the limitation is not so much labor, but rather the inability to secure sufficient capital. However, these migrants do not start, like those breaking away from the plantations, at such a low level of income that their saving is almost nothing.

In the early stages of development, these farmers also produce much of their food, clothing, shelter and simple durable consumer goods. But they are not blocked from optimum expansion as are most of the small planters and the family-size farmers in the other economy. Since the marginal productivity of labor and capital is higher in agriculture than in these activities, the farmers, by reinvesting their saving, increase the

output of the cash commodity and curtail the family production of food and consumer durables. Moreover, as their income level increases, the family prefers to purchase more of its clothing, food, shelter, services, and other consumer durables in the open market.

The more equitable distribution of income, which arises as the economy develops its export production, is more favorable for the induced development of domestic industry. A smaller proportion of the national budget is devoted to food expenditure. And the production of this food is undertaken on efficient, family-size farms. Furthermore, there is a relatively larger market demand for services and durable consumer goods. Profit opportunities arise in these lines of commodities. Initially, some of these goods are imported, while others are not consumed at all because of the high costs of transportation. But gradually trading centers spring up to answer the demands for medical, legal and personal services as well as to provide the marketing facilities for the imported commodities. All of this means investments in homes, offices, warehouses, roads, schools, hospitals, etc., which have a multiplier effect on the volume of trade.¹ As this development occurs, the mineral resources begin to be exploited. However, instead of merely becoming exports, these resources are also used to supply domestic manufacturers. For, the more favorable distribution of income and thus the relatively large demand for durables stimulates domestic manufacturing. Because of the relatively larger market demand for such items and the higher level of skill of the agricultural population, the problem of recruiting foreign labor or training domestic workers for manufacturing activity also is not as difficult as in the plantation area.

All of these factors and their interaction tend to induce a faster and a more balanced type of development. This economy has a better chance of climbing from its initial export orientation. Domestic industries spring up which, in turn, stimulated the further expansion of other domestic or export industries through external economies and the familiar multiplier-accelerator interactions.

¹J. S. Duesenberry, "Some Aspects of the Theory of Economic Development," *Explorations in Entrepreneurial History*, Dec., 1950, pp. 96-102.

V.

In order to emphasize the role which technological differences among production functions can play in the process of economic development, a number of restrictive assumptions were made in the preceding analysis. When these are lifted, the factors stressed in the traditional explanations of differential growth patterns re-emerge to a more prominent position.

First, there is the matter of the production functions themselves. In the above discussion, it was assumed that the production functions in the export industries of the two regions were such as to impose rigid constraints on the nature of the development process. While I believe this factor is and has been an important element in shaping actual development in several regions, this is not to say that it always plays an important role in the development process. For example, the production functions of some crops may be such that both plantation and small scale production are equally efficient. And, there may be wide possibilities of factor substitution with relatively slight changes in the factor price ratios. In these cases the engineering constraints of the production function will not be important in determining the character of development. It was also assumed that each region drew its productive means from a common equi-distant, purely competitive market. But obviously, if the array of factor and product prices differs in the older regions which initiate development in the two new regions and the distances to these new regions vary, the patterns of development will be affected accordingly. Differences among the factor supplying regions in the state of their technological knowledge, in their entrepreneurial spirit, in their tastes and in their social, economic and political ideas and institutions generally also will play an important role in determining the nature of development within the two regions. And, of course, the dissimilarities between the new regions with respect to their natural resource conditions are highly relevant. The effects on the preceding analysis which regional differences in the above factors can cause are fairly obvious.

Another condition which has been maintained in this discussion is the assumption of an unchanged state of

technology. Probably, most of the technological knowledge actually introduced over the last 200 years has been of two types : (1) those changes which required more capital and less labor (or other resources) per unit of output than previously ; and (2) those changes which required less of all factors.¹ How do these types of technological progress affect economic development ?

Clearly, the development problem cannot be dismissed with the assertion that technological progress will guarantee successively higher levels of *per capita* income in an automatic fashion. Three major factors should be considered in analyzing the problem : demand, the supply of capital, and the nature and growth of the population. The first factor, demand, is extremely important for those agricultural exporting nations which are so large that changes in their output affect international prices. Price and income elasticities for many agricultural products are low in the higher *per capita*, agricultural importing regions. Consequently, part of the possible real income benefits of technological progress may be lost through an adverse movement in the terms of trade. Secondly, in order to achieve the maximum growth allowed by technological progress, the requisite capital must be forthcoming. But there is no reason to assume that the saving propensities of the public and business will adjust automatically to take advantage of the new technique. In low *per capita* countries this can be an especially serious problem. Rather similar barriers with respect to the nature of the labor supply also can prevent maximum growth. Shortages of particular kinds of labor and/or general lack of entrepreneurial ability are examples of this type of bottleneck. Finally, the growth of population in relation to the increase in income will determine what happens to *per capita* income.

But, of course, technological progress does operate in the direction of encouraging a more rapid rate of increase in national income. This is especially so if the progress in technological knowledge is such that less of all factors of production are

¹See Grosse, R. and Duesenberry, J., "Technological Change and Dynamic Models," Prepared for the Input-Output Meeting of Conference on Research in Income and Wealth, Oct., 1952.

required per unit of output. However, to the extent that technological progress is such that the relative position of each commodity in the scale of labor and capital coefficients remains roughly the same, technological progress can be handled in the model by interpreting much of the development behaviour of the two regions in relative rather than absolute terms. But a radical shift in the relative position of a commodity in the labor and capital coefficient hierarchy must be treated as an autonomous change, and the analysis must be modified to take into account this new engineering relationship.

Even with the many special assumptions in this analysis, differences in the technological nature of production functions still, I think, emerge as an important factor determining actual patterns of economic development. Briefly, the argument is that the technological nature of the production function for the major commodities initially selected for commercial production influences the potentialities for further development in newly settled regions. In conjunction with market conditions in the more developed areas, these engineering constraints affect the nature of factor migration and the early distribution of income within a region. The latter factors, in turn, affect the stimuli for further economic development. While much more empirical and historical investigation is necessary to determine the extent of the technological restraints of various production functions, these differences can, I think, prove useful in contrasting actual historical development of some plantation-type economies in the world with those regions which at an early stage specialized on such commodities as livestock and grains. Furthermore, they must be carefully considered in the formulation of plans for future development.

ROBERT E. BALDWIN

Harvard University.

The Element of 'Accident' in the National Salary¹ Structure²

The purpose of the present paper is a limited one. It is not to examine all the factors that determine our present standards and levels of remuneration. It is, rather, to consider one particular set of factors—if it can be called such—namely the element of 'accident' in the national salary structure.

By element of 'accident' I mean primarily the unintended ; I do not necessarily mean the irrational. It is probably correct to say that the rate of remuneration accruing to any particular individual is the result of the interplay of numerous forces—in part economic and in part non-economic, in part rational and in part irrational. But I am not here concerned with the much wider issue of the rationale of reward, a complete examination of which is clearly beyond the scope of a brief article. The 'target' of the present attack is that additional something—the unintended repercussion of some long-past occurrence, the incidental by-products of historical events which (the by-products) no-one consciously wanted but which none the less have 'happened' and willy-nilly have exercised an important effect on the national salary structure.

As a rough working basis—though no more than that—that will help us to isolate this element of 'accident,' we may assume for the purposes of this paper that it is reasonable to pay a person a rate of remuneration which is based on economic realities, modified in practice by the various social and ethical considerations which society currently holds to be relevant. This requires that such a remuneration should be determined in accordance with the conditions of demand and supply prevailing in the (particular) labour market ; it also requires

¹This article, as indicated, deals primarily with salaries. However, where a problem is common to both wages and salaries and could be more clearly illustrated from the former, I have not felt prevented, in one or two instances, from illustrating from the wages rather than the salaries 'front.'

²I should like to express appreciation to members of the Department of Social and Economic Research, University of Glasgow, for much valuable help in connection with this paper.

(*inter alia*) that it be 'fair,' bearing in mind the nature of the post in the way of skill, responsibility and other qualifications required, due weight being given also to the 'net advantages' of the occupation. It follows that any two jobs, making the same demands in terms of skill, etc., and which are equally agreeable or disagreeable, should attract the same remuneration, unless there is some good reason for a divergence on 'demand-supply' grounds.¹ It is that part of salary structure which cannot be considered as derived from either market factors on the one hand, or, say, current notions of 'fairness' on the other, which we shall include under the term 'accident,' and which forms the subject matter of this paper. With the 'legitimacy' of these notions themselves we are not here concerned.

Let us now take a look at the realities of the labour market in so far as salaried workers are concerned. The first type of 'accident' to which we may draw attention are what might perhaps be termed 'constitutional accidents,' arising from the country's complicated institutional framework and the particular set-up of the organs of administration. Our first illustration of the influence of such constitutional accidents on the pay structure may be traced back to Britain's division of functions as between central and local government. As is well-known, large numbers of public servants are direct employees of the central departments, others of the local authority; the former are paid from the coffers of the Exchequer, the latter from the local Rate Fund (though subsidized from central funds). While there may be all kinds of reasons for our particular division between central and local government—this in itself is of course not a question of 'accident'—whether a public servant is paid by the Treasury or County Hall ought not to affect the size of his pay packet. That it does so cannot be proved mathematically, but there seems to be some evidence to that effect. Civil servants may complain about the dead hand of the Treasury, but when it comes to matters of pay, this dead hand, despite its alleged ossification, is considerably

¹While this is a huge over-simplification, we shall for the present have to ignore the difficulties involved in using our formula as a practical guide for the determination of any particular rate of pay, as well as the further problem that the requirements of the 'market' criterion may conflict with those of other criteria.

more forthcoming than the empty hand of the local authorities,¹ and it would definitely appear that, except perhaps at the highest levels, the Treasury is the more accommodating pay-master. To the extent that the lower level of local government remuneration is the incidental by-product of the country's constitutional set-up, this can be considered an 'accidental' feature of the national salary structure.

Let us now take the case of doctors. It might be assumed that this simple fact of being a doctor would be all-important in determining remuneration: a doctor's pay, one might have thought, would depend on the value of his work, plus any adjustments required by the conditions of demand and supply in his particular field of activity. In fact, however, his remuneration depends to a much greater extent on where he happens to work, *i.e.* whether he happens to be engaged in the National Health Service, Civil Service or the School Medical Service. It is not the case that his salary as a school doctor is lower than in the Civil Service Medical class, and lower in the latter than in the National Health Service by reason of economic factors. On the contrary, relative rewards in these cases are the reverse of what they should be if in accordance with economic realities: the shortage of doctors is greatest in the School Medical Service, while in the National Health Service there are ominous rumours of over-supply. It would appear that, more important than the fact that X is a doctor and more important than the relative extent of undermanning in the service in which he works, is the fact that he is a Local Authority/Civil Service/National Health Service man, each of which services has somehow or other acquired a certain 'appropriate' level of remuneration.²

¹At the 1952 annual Conference of the National Union of Teachers a resolution was passed that the Executive be instructed to press for an alteration in the local education authority grant formula, so as to reduce the dependence of teachers' salaries on the public rates (reported in *Schoolmaster*, 25th April, 1952, p. 595 and p. 588).

²In a letter to the negotiators on behalf of Civil Service Medical Officers during the 'wage-freeze' of 1950 (see *Whitley Bulletin*, June, 1950, p. 87) the Chancellor of the Exchequer, while not disputing that there was a case for reviewing their remuneration and salary structure, stated that he was unable to agree that the claim could be considered except as a Civil Service claim, to be dealt with on the basis of the policy applied to the Civil Service generally.

One qualification, however, is necessary. There are of course different kinds of doctors, and it is generally agreed that a highly skilled surgeon is worth more, and therefore should earn more, than, say, an ordinary G.P. It might further be argued that even within each branch of the profession there are differences of skill and expertise, and that one reason why a doctor in the school medical service is badly paid by comparison with other members of the same branch of the profession (*i.e.* general practice) is that—to put it bluntly—a second-rate G.P. is considered good enough for looking after school children's health. The fact that expressed thus baldly and explicitly such a suggestion would come as a shock to local education authorities does not necessarily disprove its veracity: many things are implicit in our behaviour which, if stated in so many words, would prove distasteful. A local authority would no doubt put itself in an impossible position if it openly admitted to being prepared to recruit to its school medical staff those ugly ducklings of the labour market, men of 'low calibre,' but it may none the less be tacitly understood that second- or even third-rate doctors are considered adequate, and that the lower salary offered to buy their labour is a realistic reflection of this 'gentleman's agreement.' To the extent that this is so—to verify this we would have to penetrate the collective unconscious of local education authorities—our earlier strictures must be modified.

A rather different example—also under this heading of constitutional accidents—are our standards of reward for 'political and public service.' It is the constitutional framework within which a service is rendered, rather than the nature of that service, which determines the scale of reward: ¹ if you help to administer transport services as a member of a local authority, your pay is nil, but if you do so as the member of a board of a nationalised industry, you may get a handsome fee for a similar effort. On 'rate for the job' grounds, clearly, remuneration should be identical in the two cases, nor do conditions in the two 'labour markets' show any good reason for the difference in treatment.

¹For a fuller discussion of this point see "Payment for Political and Public Service," *Public Administration*, Summer, 1954.

Similar anomalies arise as a result of the difficulty of delimiting with precision the sphere of particular services and industries. Thus judges of the Supreme Court are paid out of the Consolidated Fund, and their remuneration can be increased only by Act of Parliament. Judicial officers on the other hand, such as, for example, Official Referees to whom the trial of questions arising in civil proceedings before the High Court may be referred, also have very definite judicial functions: they (Official Referees) have been jocularly referred to as trying those cases that are too difficult for the Judges!¹ Yet for salary purposes they are deemed to be civil servants, so that their pay is adjusted whenever that of senior civil servants is. Though High Court judges have, until recently, been expected to display a stoic indifference to the shrinking of their pay packet in real terms, they may well have secretly looked askance at the narrowing of the gap—which has occurred every time civil servants, and therefore Official Referees, got a rise—between them and what are very much their junior partners in the business of administering justice.

Another illustration may be cited from the organisation of the country's educational services. It so happens that Primary and Secondary education in this country are the responsibility of the Minister of Education and the Secretary of State for Scotland, while the Universities are independent, autonomous bodies. The result is that in England and Wales a primary school teacher playing with infants is officially the same kettle of fish as a person instructing the Sixth in the intricacies of higher mathematics,² though the University lecturer, teaching the subject to undergraduates, belongs to a different (though not necessarily better-paid) species. Yet it might be argued that the gap between the infants' teacher and Sixth-form master is as great as that between the latter and the University lecturer, and that there is as good, or as bad, a case for equating the pay of the latter as of the former.

¹14th Feb., 1951, 170 H.L. Deb., col. 317.

²*i.e.* their basic rate is the same. The teacher in the Grammar school may none the less, and frequently does, receive more than the Primary school teacher, because of his having a degree, longer training, etc. These additions are, however, equally open to the Primary school teacher.

Next, we may mention the well-known fact of the differing strength of trade unions in different spheres. While the power of trade unions to affect the overall level of wages has been hotly debated, there are few economists who would deny the power of individual unions to gain sectional advantages for particular groups of workers. It is of course the case that the strength of a trade union is to some extent a function of genuine economic factors such as the degree of industrial concentration, differing rates of technological change and the overall prosperity of the industry concerned, but relative bargaining success is certainly not solely determined by such factors. To the extent then that the pay of a section of the labour force is higher than otherwise justified because of the existence of a powerful union in the field, and to the extent that this is due to causes such as, say, the existence of a militant leadership, this produces an unintended, *i.e.* an 'accidental,' element in the pay structure.

The whole question of the strength and structure of trade unionism has had other interesting results. Thus, there are many unions catering for a whole craft, wherever that craft may be found: the Amalgamated Engineering Union and the Electrical Trades Union, who organise engineering workers and electricians, are good examples. These Unions conclude bargains with Employers' federations, which are applied to engineering workers and electricians in a wide variety of industries—broadly speaking wherever such workers are employed. As a result, we have a national standard rate of pay in these cases. On the other hand, clerical workers have no such nation-wide rate, for the simple reason that there is no such thing as an all-embracing clerks' union/employers' federation. While there are important unions in the clerical field such as N.A.L.G.O., the Civil Service Clerical Association or the Clerical and Administrative Workers' Union, none of these has reached the same degree of 'universality' as, say, the A.E.U.

A similar effect is produced by the incidence of the Wages Councils system. While the existence of Wages Councils as such is far from being a matter of 'accident'—they are set up where either pay or trade union organisation (or both) are inadequate—their precise incidence may well contain such an element.

Thus there is a Road Haulage Wages Council which fixes the pay of road haulage workers employed in a large number of industries, quite apart from those engaged in the road haulage industry itself. Similar nation-wide standards exist for catering workers—manual and salaried—as a result of the existence of the various Catering Wages Boards ; the rates laid down by these bodies again are applicable not only to those engaged in the catering industry proper, but to catering personnel wherever they may be found. Yet there are other types of workers whose employment is common to many industries, whose pay is low, and where trade union organisation is weak, but no such uniformity of remuneration exists in their case, because they are not covered by a Wages Council. Cleaners, it is reasonable to hope, are employed in every factory, but there is no such thing as a national cleaner's rate.

Again, the type of negotiating machinery which exists in an industry/service is, in practice, likely to have a considerable influence on the pay accruing to those within its purview. It is of course true that the status of particular negotiating machinery is, in part, a function of its constitutional position (just as its form is partly determined by the number and strength of unions and employers' federations in the field). The negotiating machinery responsible for settling the remuneration of policemen, for instance, directly reflects the constitutional position of the Police service : the Home Office and Scottish Home Department are represented on the Police Council for Great Britain in addition to the 'two sides' because the Secretaries of State have important statutory functions in this sphere. On the other hand, the composition of the National Joint Council for Local Authorities' Administrative, Professional, Technical and Clerical Services is determined by the fact that this is a purely voluntary body. None the less, within the broad limits set by the constitutional background, there is still much that appears to be chance growth. For example, that employees of the central government have the Civil Service Arbitration Tribunal ready at hand, while in the case

of teachers there is no similar body¹ to whom disputes can be referred is perhaps a question of detail, but in practice such matters of detail are important ; the absence of such a Tribunal may have cost teachers a tidy sum. Again, it so happens that the Burnham Committees, which fix the remuneration of school and technical college teachers in England and Wales, have adopted the practice of fixing salaries for periods of three years at a time, so that unless teachers are exceptionally vocal and restless,² their remuneration remains unchanged for periods of that length at a stretch. In other negotiating bodies no such practice has developed, but there seems no valid reason why it should exist in one sphere but not in another. What this means, therefore, is that the frequency with which one's remuneration changes may depend on practices which, as a matter of chance, happen to have become established. It may be added that in both the examples cited the element of 'accident' is ascribable to the negotiating machinery itself, and not simply to peculiarities of constitution or trade union organisation³ being in turn reflected in peculiarities of collective bargaining arrangements.

By way of one more illustration under this head, we may compare the collective bargaining arrangements in the nationalized Gas and Electricity industries. In the former, we find that the bulk of clerico-administrative staff on the one hand, and engineering technical and professional personnel on the other, are covered by a single body and hence by a single Agreement, while in the Electricity Supply industry these two categories are treated entirely separately for purposes of salary negotiation. The reason for this would appear to be that in

¹In March, 1952, the Education Act, 1944, was held to rule out the settlement of teachers' remuneration by arbitration, as Section 89 provides that only the Burnham Committee itself can advise the Minister on this question. In a sense therefore the non-existence of a tribunal for teachers has a statutory basis and might seem to qualify as a 'constitutional accident' rather than a peculiarity of collective bargaining machinery. Discussions at the time made it clear, however, that the precise wording of Section 89 was itself accidental, so that the non-existence of a tribunal in this instance is still essentially an 'accident' arising out of collective bargaining arrangements.

²A "Special Addition," *e.g.* was granted in July, 1952, over and above the new scales payable from April, 1951.

³As is the example in the following paragraph.

Electricity there exists the Electrical Power Engineers' Association organising technical staffs, while in the Gas industry no such separate 'technical' union has found a foothold, so that on the nationalization of the industry it was possible to set up a National Joint Council for Gas Staffs which covers both clerico-administrative and technical/professional workers (below a certain salary limit). The fact, therefore, that in the Gas industry the pay of an engineer and an administrator are (a) equated and (b) move together, while in Electricity Supply they are 'organically' ¹ quite unrelated, may be said to be due to the accidents of trade union strength and structure having, in turn, become perpetuated in collective bargaining arrangements.

The type of 'accident' discussed so far has been largely of the *inter*-industry type—which it has been the purpose of this paper to discuss—but the comparison of the collective bargaining arrangements in Gas and Electricity above is also illustrative of elements of accident in an *intra*-industry context, about which a brief word may be added. Here we find that just as, what should be like and like as between industries and services is, due to chance factors, like and unlike, the same is true of relativities within any one service. Thus the salary structure which happens to have developed in a particular field will determine whose pay will be equated and how wide the span of a particular umbrella will reach. In the Local Government field, for instance, we have the well-known pattern of seven A.P.T. (Administrative, Professional, and Technical) grades, which constitute a unity covering all Administrative, Professional and Technical workers (except the most senior officers); when a salary rise is negotiated it automatically applies to all A.P.T. personnel. A similar system operates in the B.B.C. where a common grading scheme is applied to all (non-manual) engineering, 'programme' and administrative staff, the Corporation having its own system of job evaluation by which it equates rates of pay among the different categories. In the Civil Service, on the other hand, not only are there separate

¹Though the two sets of rates are 'organically' unrelated, a salary increase granted to one may none the less lead to a 'sympathetic' rise to the other.

salary scales for, say, administrative workers on the one hand, and each professional group on the other, but in many cases several scales exist—in the shape of Departmental variants¹—to cover one and the same occupational group. It follows also that remuneration in the Civil Service is mostly adjusted on a sectional basis, *i.e.* legal/administrative/clerical/technical, etc. civil servants all bargain separately with the Treasury, though there have been some notable exceptions of all-Service settlements. It is of course true that on grounds of size alone the Civil Service is 'entitled' to a more complex pattern of classes and grades, and it is also reasonable that the different scope and function of the various services should be reflected in a different organisational set-up. None the less, looking at the salary world one cannot help feeling that internal relativities frequently depend as much on the chance facts of salary structure as on any policy of consciously worked-out differentials.

Again, as far as any one individual is concerned, the particular pay structure of the service in which he works may affect him in several ways. For example, whether or not his personal qualities are weighted in his remuneration, as distinct from the job itself, will depend on whether a scale or a range of pay exists in his particular sphere of employment. Where there is a rigid salary scale, no personal assessment takes place and pay is solely related to the job. Where, on the other hand, there is a range, the payment of the individual within this depends both on the job performed *and* personal merit. If we could be sure that, where a range exists, it does so with this very flexibility in view, then, of course, no element of 'accident' would be present; however, in those cases where the existence of a range rather than a scale is a mere matter of chance, it can be said that individual merit is weighted, as it were, by accident.

Remuneration, again, is frequently influenced by various notions which have grown up, and which in one case are 'allowed' as a determinant of pay, but in another—though seemingly equally applicable—are disallowed. By way of

¹*i.e.* the various Departmental classes, in contradistinction to the General Service or 'Treasury' classes.

illustration, we may cite the case of the judges where it has been assumed—in the past at any rate—that they need pay on a level towering above that of ordinary mortals, in order to keep them incorruptible. This, among other reasons, is why English High Court Judges were given £5,000 per annum (then free of tax) as long ago as 1832. In the case of Hon. and Gallant Members of Parliament, on the other hand, where there would also appear to be plenty of opportunity for unsavoury behaviour, the general view—judging by public opinion in Press and Parliament recently—seems to be that it would be catastrophic if they received more than the absolute minimum necessary to keep body and soul together. The principle, *i.e.*, that where corruption might potentially occur, this is to be guarded against by a very high salary, making the fruits of such corruption less tempting, has been given great weight in one case, but ignored in another. It is true of course that in the case of the M.P. there is the discipline of the ‘sack,’ while the removal of one of H.M. judges is an extremely complicated procedure and almost unknown in practice. There is, therefore, a certain justification in taking very special precautions before installing a judge in his high office, and to make sure of the right man by offering an appropriate salary. It is also the case that there are other reasons for the high remuneration laid down for judges in the 19th century, namely to compensate them for being no longer permitted to take a share of their litigants’ fees and because men had (and still have) to be tempted to the bench from lucrative private practice.¹ In so far as the latter consideration has been operative, it illustrates the importance of a genuine economic factor: judges’ remuneration, *i.e.* had to be fixed at a level that took account of their current price in the legal labour market. Certainly, then, economic considerations were also involved in fixing judges’ remuneration at their very high level in the 19th century, but this does not necessarily invalidate the point made earlier on.

Similarly, there is the notion that social workers should be satisfied with a smaller financial reward—nurses are the classic,

¹cf. Radcliffe & Cross, *The English Legal System* (Butterworth, 1946), pp. 378–381 and R. M. Jackson, *The Machinery of Justice in England* (C.U.P., 1953), pp. 225–6. Jackson considers the latter the main reason.

though by no means the most glaring, example¹—the balance of which is to be reckoned in terms of the intrinsic satisfaction to be derived from their work. For a doctor, on the other hand, it is not considered unethical to derive a handsome income from his labours as well as the satisfaction. Thus, certain notions have been evolved as to who should work 'for love,' who for the honour of it plus, perhaps, a small honorarium, and who, on the other hand, may draw a large salary (with or without the honour!). Why these particular notions and value judgments have grown up is a fascinating question though outside the scope of this paper, and one that in any case cannot be answered without a great deal more analysis. What is clear, however—and this is primarily why they are legitimate 'fuel' here—is that whatever the origin of these ideas and whatever the degree of their germaneness (if any) in the context of pay determination, their application would appear to be quite arbitrary.

The element of 'accident' in the national salary structure is, in a sense, cumulative, in that the above factors are aggravated by the fact that each service has developed its own particular 'idiosyncrasies.' We can illustrate this by referring to the subject of area differentials. Thus if you are a National Health Service consultant transferring from a rural or small town hospital post to London, your pay will be unaffected. If you are a school doctor making the same move, your pay will go up by £30,² while if you are a doctor employed by the central government, your salary will go up by anything up to £100—depending on your 'salary band'—in consideration of your residing in the metropolis.³ This, again, has nothing to do with the state of demand for doctors in these different services or with, say, 'rate for the job' factors, nor would anyone seriously maintain that a N.H.S. consultant will find his cost-of-living unchanged in his new environs, while the Civil Service

¹The salary of a staff nurse in 1946 was the princely sum of £220, rising after many years of service to £280 (*including* residential emoluments, valued at £100 per annum).

²Less, if under 26 years of age.

³Provincial differentiation in the Civil Service, that is, depends on actual salary and location. £100 per annum is the maximum differential as between London and "provincial" posts where salary is £1,577 per annum or over. As between London and "Intermediate" offices the maximum differential is £50.

medico finds his increased by £100. It is simply a reflection of the fact that each of these services has developed its own particular brand of area differentiation. The latter in itself is of course a perfectly sound feature of salary structure : provincial differentiation as such, *i.e.* is in no sense of the term 'accidental.' It is its incidence to which objection is being taken—and the story could be repeated, *mutatis mutandis*, as regards sex differentials and numerous conditions of service.

If economic theory and practice would correspond more closely, some of the anomalies cited might be expected to right themselves in the long run ; the time framework is clearly of considerable importance in this whole matter. The fact, *i.e.* that at any particular moment in time a certain service offers a low rate of pay for a certain grade of worker ought to mean that sooner or later—depending on the degree of competition in the labour market—a poorer candidate will come forward, willing to fill that vacancy. In a sense, pay will then be adequate in relation to the quality of the personnel now concerned. For example, it is fairly well-known that Co-operative societies pay their managers salaries which are much inferior to those current in the business world at large, and some have ascribed the mediocrity of Co-operative enterprise (in certain spheres) to the societies' not attracting the right calibre of managerial ability. What concerns us here is that the fact that Co-operative managers were originally underpaid—*i.e.* in the short run—has in a sense righted itself through the mechanism of market forces, so that the type of Co-operative manager who now offers his labour can no longer be so considered : what was inadequate remuneration in the short run has become adequate in the long. If it were not for the rigidities of the labour market, if the latter were more perfect, we might expect the market mechanism to iron out a great many more of such anomalies over a period of time. As it is, owing to its well-known imperfections—such as the lack of mobility and elements of monopoly on the side of both capital and labour—this adjustment is often prevented or only very partially effective.

There is, however, another point. It is quite legitimate to take the line that on wider economic grounds—say in the interests of greater efficiency—or, say, on 'rate for the job'

grounds, Co-operative managers should have £x per annum, irrespective of the human raw material which at that particular juncture occupies these posts, and irrespective also of the fact that a new equilibrium has been achieved in the demand for, and supply of, Co-operative managers. Looked at from a wider angle, *i.e.* an individual may be receiving his due relative to his capabilities, but none the less, according to our conception of the job to be performed, the post may yet be underpaid. Even where, therefore, economic forces help to adjust the quality of the supply to the magnitude of the demand price so that individual Co-operative managers are possibly no longer underpaid, in a more fundamental sense they can still be said to receive less than their due. And to the extent that non-relevant factors inhibit us from offering a price more truly in accordance with the intensity of our demand, the element of 'accident' is again at work.

A number of different types of 'accident' have been distinguished, but it should be made clear that the line of division between them is of the loosest. As far as their effect is concerned, the types enumerated are, basically, of two kinds. The various conventional notions produced by history have meant, by and large, that considerations have been allowed to influence pay levels the legitimacy of which is very much in question and, further, even where it might be conceded that a certain factor is a legitimate co-determinant of remuneration, the field in which it is allowed to operate is frequently arbitrary. The accidental impact on the national pay structure of constitutional developments, the particular set-up of the organs of administration or of trade union strength and structure, on the other hand, have meant that numerous institutional frontiers have been erected for which, as far as relative levels of remuneration are concerned, there is no rational (or irrational, but at least intended) basis. What has happened is that, as in the world of politics, these frontiers and lines of demarcation have 'happened' rather than been drawn, and so territories have in many cases become delimited with little regard to any clearly definable criteria. The result is the inevitable crop of frontier problems—in our case unjustified differences and anomalies in pay and service conditions.

We must, of course, not lose our sense of proportion. It is not claimed that the world will come to a premature end because there is a considerable element of 'accident'—and therefore numerous anomalies—in the British wage and salary structure. Nor is the existence of these anomalies altogether surprising; they are part of what Professor Sargent Florence has so aptly called the "criss-cross interlacing of occupation and industry."¹ In many cases, also, employing authorities are aware of, but feel impotent to do anything about, these anomalies, being faced with the well-nigh impossible task of fixing a salary which is in accord both with the requirements of 'horizontal' and 'vertical' relativity. The salary of prison chaplains, for example, should ideally bear a proper relativity² to that of clergy elsewhere—this is what we mean by occupational or 'horizontal' relativity—and to that of other personnel in the prison hierarchy ('vertical' relativity). Similarly, school medical officers should have remuneration which is 'fair' both relative to that of other doctors (of equivalent calibre) and other school staff; the British Transport Police should receive remuneration which 'ties up' both with pay in British Transport and in the Police; while medical professors should have a salary in line both with that of other medicals and other professors. In all the instances cited this problem of the two relativities pulling in opposite directions has caused acute embarrassment, and the salary world is full of similar cases. While this conflict of relativities is in some cases the product of economic causes—a shortage of labour, for instance, may make it necessary to pay a particular worker more than that to which he is entitled on 'relativity' grounds—in others the existence of the problem is essentially due to the fact that the accidental element in salary determination has been allowed to solidify into a permanent constituent of salary structure.

Some of course may take the view that anomalies have the merit of making for diversity, and are to be welcomed on that

¹P. Sargent Florence, *Labour* (Hutchinson's University Library), p. 14.

²What constitutes such a 'proper' relativity is a by no means easy question, but one that cannot be dealt with within the compass of this paper.

account. However, there is plenty of evidence that a critique on the lines we have attempted is more than an academic red herring. The huge amount of time, energy and money spent on wage and salary claims up and down the country *inter alia* demonstrates—though by no means all such claims are concerned with the righting of anomalies—that those affected take a poor view of some of the illogicalities of the wages front, even if some armchair onlookers consider them as adding to the spice of life. It is true that these inconsistencies do not necessarily involve very substantial differences in actual remuneration. But it is the small differences, the anomalies at the margin, which frequently give rise to friction—and economists are hardly in a position to complain if workers take the margin seriously ! In fact, where the anomaly is so great as to remove one class of worker on to a different plane altogether, there may be less trouble, than where there are relatively modest anomalies—modest enough, that is, to leave the two categories as competing groups, as between which parity of pay and esteem are still within the bounds of possibility.

This paper has not been an attempt to evaluate all the many and complex factors that determine relative levels of income. Nor has it been the intention to say that economic factors are of no consequence, and that elements of 'accident' reign supreme in shaping relative rewards. A very well-known, but for that reason no less good, illustration of economic factors at work is the case of the coalminers, whose pay was at the bottom of the industrial wage structure in the 1930's when coal was depressed, but who now top the bill of industrial earnings.¹ Again, in 1951 it was recommended in the Trustram Eve Report that the pay of police constables be raised by "£30 more than the increase to which . . . he is entitled in relativity with other workers . . ." in view of the serious under-manning in that

¹The average weekly cash earnings of adult male workers in coal-mining (excluding the value of allowances in kind) at 16th Oct., 1954 was 264/11d. The highest average earnings for any other industry (adult men, last pay-week Oct., 1954) was 253/1d. a week (Manufacture of Motor Vehicles and Cycles). The averages for the great majority of other industries are a good deal lower. (See *Ministry of Labour Gazette*, March, 1955).

service ¹—in view, that is, of the excess of demand over supply. More generally, in the process of 'exposing' the accidental element in salary structure, we have on many occasions had to modify our strictures on finding that economic considerations were involved even where irrelevant or chance factors seemed at first sight to monopolise the picture. Economic forces certainly are at work, and if this paper has dealt very largely with the influence of a set of non-economic factors, it has merely been to secure a niche for what has hitherto been hardly deemed worthy of *Lebensraum*.²

HILDA R. KAHN

Glasgow.

¹Report of Sir Malcolm Trustram Eve to Secretaries of State for Home Department and Scotland, July, 1951. (Not published, but made available by courtesy of Home Office).

²This paper was written before the publication of *The Social Foundations of Wage Policy* by Dr. Barbara Wootton, whom I wish to thank very much for reading the article in draft.

Econometric Models and the Evidence of Time Series Analysis

J. Johnston in his recent survey of results obtained by three alternative approaches to the analysis of cyclical fluctuations (mathematical, econometric, empirical) has presented extremely interesting evidence, and it yet remains to colour various shades of interpretation that may be drawn from it.¹

Johnston effectively shows that we cannot accept the hypothesis that all the economic series of a country have the same cyclical or autoregressive structure.² He thus casts doubt on Orcutt's idea that Tinbergen need not have gone to all the trouble of constructing his complex set of equations to explain the U.S. trade cycle because of the supposition that one single autoregressive equation summarized all the important cyclical information about the system.³ We may call this a "supposition" because it follows from a theorem about the properties of linear systems provided certain stringent assumptions are met, namely, that the econometric mechanism is purely endogenous with no disturbances or that exogenous variables and disturbances, if present, follow certain manageable forms. Johnston does not, in my opinion, give adequate emphasis to some of the reasons underlying his own findings.

In a linear system of lagged relations, the proposition that each variable has the same autoregressive structure depends on there being special features of both the disturbances and the exogenous variables. The fact that the autoregressive equations for the different endogenous variables will generally each depend differently on the exogenous variables is important in explaining the observed phenomenon that cyclical structure varies by

¹J. Johnston, "Econometric Models and the Average Duration of Business Cycles," *The Manchester School*, Vol. XXIII, Sept., 1955, pp. 193-227.

²For similar arguments see A. J. Gartaganis, "Autoregression in the United States Economy—1870-1929," *Econometrica*, Vol. 22, April, 1954, pp. 228-43.

³G. H. Orcutt, "A Study of the Autoregressive Nature of Time Series Used for Tinbergen's Model of the Economic System of the United States, 1919-1932," *Journal of the Royal Statistical Society, Series B*, 1948, pp. 1-53.

sectors of the economy. The long cycles customarily associated with construction could be explained, in contrast to the shorter cycles associated with aggregate employment, by some basic demographic trends, the effects of wars, credit policy, and the long physical life of structures. It would be possible and reasonable to devise a linear model with construction depending on these exogenous variables and the other equations containing differing mixtures of other exogenous variables in such a way that the final autoregressive equation for construction implies a time path with long cycles laid out to a large extent by these enumerated exogenous variables, while the autoregressive equations for other variables imply quite different time paths with shorter cycles. Similar reasoning could be pursued for other variables that are less marked in their cyclical differences than is construction. As Gartaganis found, American agriculture shows a different underlying time structure from that of industry. Surely such exogenous processes as internal population migration, fluctuations in world commodity prices, technological innovations, and government subsidy programs account for a good part of the observed differences. In principle, the exogenous variables could account for a wide variety of distributions of time paths among different variables, but in practice I should not like to suggest that they do more than re-inforce some of Johnston's findings.

In econometric model construction, variables associated with government decisions—expenditures, receipts, employment, monetary policy—are regarded as exogenous. This is certainly Tinbergen's assumption. Some of the more important of these variables have strong trends, strong cycles, or even sharp breaks (*e.g.* at the beginning or end of war periods or with the rise and fall of governments). In so far as trends and cycles can be accounted for by the first two autocorrelations, we can rely on Johnston's findings with regard to serially correlated disturbances in final autoregressive equations, for his disturbance variables can be treated as a linear compound of actual disturbances and exogenous variables. His scheme of analysis, though, is restrictive since he considers only two non-zero autocorrelations. This assumption does not seem to be as applicable to the exogenous variables as to random disturbances.

As to his investigation of the effects of shortness of economic time series on observed cyclical properties, we can entertain no doubt of its relevance.

In going beyond Johnston's limited objective of studying the mean distance between peaks or upcrosses, we may observe that the solution path of a variable in a linear lagged system of the type used in econometric models can be considered to be built in two parts, the general solution of the homogeneous equation and a particular solution of the complete equation, the latter involving both exogenous variables and disturbances. The importance of exogenous variables in the complete equations is to be emphasised. In a world with large and growing government controlled variables, "long-run" analysis from econometric models is extremely hazardous. Extrapolation is, in any event, difficult but especially so in the long-run (a decade or more) when one guess is as good as another about the underlying, but all important, government policies.

NONLINEAR MODELS

It seems to a reader that Johnston began his study with a null hypothesis that he expected to refute, namely, that linear systems are adequate. On the basis of his empirical findings he was not able to conclude that linear systems are inadequate, although his arguments in this connection can use fortification as indicated above ; nevertheless he concludes with a recommendation for the use of nonlinearities in econometric models.

A strong case, on purely analytical or theoretical grounds, can be made for the use of nonlinear systems. They are capable of maintaining endogenous undamped oscillations without being explosive—limit cycles—and these are not generally possible in linear systems. Moreover the empirical evidence relied on by Johnston, namely the cyclical analysis of the National Bureau of Economic Research, is claimed to indicate no basic trend in either the amplitude or periodicity of cycles.¹

Many students of business cycles tend, however, to take a narrow view of things and attach too little importance to either the disturbances or exogenous variables. These two components

¹A. F. Burns and W. C. Mitchell, *Measuring Business Cycles* (New York : National Bureau of Economic Research), 1946, chapter 10.

are responsible for a good part of Johnston's findings that each economic series does not have the same autoregressive structure that would follow from an exact linear system without exogenous elements. They are similarly responsible for the maintenance of oscillations in a linear system. The general solution must take these important variables into account, and they could easily prevent the dampening in the solution of the homogeneous equation from being effective.

Much reliance is placed nowadays on the existence of "floors" and "ceilings" for the explanation of trade cycle phenomena, and Johnston speaks of the restraints of high employment in the development of the economy, but the fact is that we do get large economic fluctuations induced by the linear segments between floor and ceiling. Under full war mobilization we do reach serious bottlenecks, and this is undoubtedly expressible best through nonlinearities, but for more normal periods, the entire set of post-war years included, it is not at all clear that we cannot represent the trade cycle by a linear system with strong effects of exogenous variables and disturbances.

In building a complete system of the economy certain nonlinearities are bound to occur, but these are probably not the ones implied by Johnston. The inevitable nonlinearities are caused by the fact that in some equations we need to deal with physical quantities, in others with monetary values, in others with relative prices, and in others with absolute prices (especially in those with speculation for holdings of inventories and securities). The basic identity showing that price times quantity equals money value makes it certain that all these variables will be tied together in a nonlinear system. In the equations of production and supply, there may be some real nonlinearities in addition to those having to do with price, quantity and value. True production bottlenecks do occur, and a production function and similar equations can well be envisaged as nonlinear. These combined with nonlinearities in expenditure behaviour for either consumption or investment goods will make a highly complicated system of nonlinearities. To a large extent, it may be possible to get a tolerable approximation to these nonlinearities by the piecing together of linear

segments. For example, I have argued in my own work on econometric model construction that nonlinearities in consumption behaviour may be approximated by separate linear terms in wage income, property income, and agricultural income. In so far as we are able to use linear approximations of this sort and yet preserve the flavour of nonlinearities in behaviour I think that it pays to achieve the enormous simplifications of linearity. The whole statistical apparatus and subsequent manipulations of econometric models follow through much better in linear systems. I am not arguing for the preservation of incorrect simplicity, but it does seem that empirical evidence is quite weak on the case for nonlinear over linear systems, and the supposed theoretical superiority of nonlinear systems in having an endogenous cycle is not necessarily to be preferred to a linear system subject to exogenous and random perturbations.

Of course there are degrees of nonlinearity and certain forms may be inevitable in models of an economy, yet we must establish a solid empirical groundwork of nonlinearities that have justified the model builders' assumptions before complicating our systems to this extent.

L. R. KLEIN

*Institute of Statistics,
Oxford.*

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Patterns of Public Revenue and Expenditure¹

I. INTRODUCTION.

This article compares the revenues and expenditures of sixteen countries at different levels of economic development. Its main purpose is to see how patterns of expenditure and sources of revenue vary with economic development, in the hope of discovering in this process what patterns are appropriate to different levels of development.

The basic statistics are set out in six tables at the end of the article, which are described more fully in the Statistical Appendix. Except in the case of Colombia, the material is for a year overlapping with 1953 or 1954. The figures have been classified according to the categories of expenditure and the sources of revenue. They are all shown as proportions of Gross National Product at factor cost.² Current expenditure is distinguished from capital expenditure, but no distinction is made between transfer expenditures and expenditures on goods and services. The figures are consolidated for all public authorities (central state, and local authorities), except in Tables VIII, IX, XIII, XIV and XV, which relate to state and local finance exclusively.

Comparisons of this kind are subject to several criticisms. First, different countries classify the same expenditure in different ways. We have tried to meet this by going through the budgets and classifying expenditures according to a common pattern; hence the figures for each country appear according to our classification, which is not necessarily the same as that used in the country's budget.

Secondly, expenditures which appear in the budgets of some countries are left to other agencies in other countries. For example the expense of medical care falls mainly upon the government in the United Kingdom, but is left to private

¹Some of the material of this paper was used for the Sidney Ball Lecture delivered in the University of Oxford by Professor W. A. Lewis on 4th May, 1956.

²Except in two cases, where we have had to use other national income concepts. See Statistical Appendix.

individuals in the United States of America. The figures are not intended to show how much a *country* spends on a service, but only how much its *governments* spend. Public undertakings and nationalised industries are the most difficult case. We are concerned with these only in so far as they affect the budgets of the public authorities. For example, if their profits are paid into the Treasury, or their losses met by the Treasury, they (*i.e.* the surpluses or deficits only) are included in our accounts; but if their surpluses or deficits are not in the government's accounts they are excluded. Similarly, if the government has to find capital for them, this will appear in our figures of capital expenditure; but if they borrow in the capital market or finance capital expenditure out of their own profits, these sums are not shown in our figures.

Thirdly, comparisons of the Gross National Product of different countries are always shaky. We escape most of the usual problems, since our tables do not require G.N.P.'s to be compared directly. Nevertheless the structure of G.N.P.'s differs, especially in the respective proportions of monetary and of subsistence income, and also in the different ways in which subsistence income is valued, and these differences need to be taken into account in making comparisons. Despite the difficulties inherent in using G.N.P. as a base, we have preferred to use it instead of using "Total Expenditure" or "Total Revenue," because we find it more illuminating. For example, general administration as a proportion of current expenditure is 13 per cent. in Sweden and 35 per cent. in India. We find it more illuminating to note that general administration costs 3.07 per cent. of G.N.P. in Sweden and 3.09 per cent. in India, but any reader who prefers to convert our tables into proportions of total revenue and expenditure can do so for himself.

Section II of the article deals with expenditure, distinguishing current and capital expenditure. Section III is concerned with the sources of revenue, excluding loans. Section IV is a brief note on the finances of "local" authorities, using this term to include not only municipal and rural authorities, but also states, provinces and other units in federal structures.

II. EXPENDITURE.

When we began this investigation we expected to find that public expenditure rises relatively to national income as income grows. This is very broadly true, as far as total expenditure goes. Table I shows current expenditure of the sixteen countries, in order of G.N.P. per head. Column *A* shows total current expenditure, while Column *B* shows the total excluding expenditure on social insurance, food or agricultural subsidies, defence and public debt.

TABLE I
CURRENT EXPENDITURE AS % OF G.N.P.

	A	B		A	B
Tanganyika ...	11.91	10.68	Colombia ...	11.80	8.42
Uganda ...	12.26	10.78	Italy ...	24.58	12.79
India ...	8.84	6.15	Trinidad ...	15.54	12.42
Nigeria ...	4.98	4.34	France ...	25.76	10.79
Ceylon ...	14.42	11.59	U.K. ...	34.00	11.52
Gold Coast ...	12.20	10.43	New Zealand ...	30.12	13.77
Jamaica ...	13.08	10.38	Sweden ...	23.49	13.26
British Guiana ...	14.29	11.44	U.S.A. ...	27.43	7.24

It will be seen from Column *A* that there is a rough relationship between total expenditure and G.N.P. per head. The mean of the first four figures is 9.50 per cent., the mean of the second four 13.50 per cent., the mean of the third four 19.42 per cent., and the mean of the last four 28.76 per cent.

This relationship does not, however, extend so clearly to Column *B*. The great differences between the richer and the poorer countries are in the amounts spent on defence, on the public debt (which reflects past defence expenditure), on social insurance schemes, and on food or agricultural subsidies. Expenditure in these four categories is excluded from Column *B*, so that what is left—the civilian administrative services, health and education—comprises the major expenditures of the poorer countries, suitable for comparison with similar expenditure in the richer countries.

(a) "Basic" Expenditure.

Let us begin by comparing only this "basic" expenditure, which is common to countries at all levels of development. The figures in Column *B* show only a slight correlation with income per head. The mean of the first four is 7.99 per cent. ;

of the second four 10·96 per cent. ; of the third four 11·11 per cent. ; and of the last four 11·45 per cent. The coefficient of rank correlation is only 0·46.

If we confine ourselves for the moment to the services included in "basic" current expenditure, it is appropriate to ask why anyone should expect the proportion of G.N.P. spent on these services to be a function of G.N.P. per head. There are three reasons for expecting the proportion to grow with G.N.P., and one reason for expecting it to fall.

The first reason for expecting the proportion to grow turns out to be fallacious : it is that the proportion has in fact grown in Europe and in North America during the past hundred years, during which G.N.P. per head has also grown. This is the fallacy of *post hoc propter hoc*. The main reason why these countries now spend relatively more on their public services than they did a hundred years ago is not that they are richer, but that they have a different conception of the duties of the state. The citizens did not take it for granted a hundred years ago that public authorities must pay for schooling for every child, that they must pave and light the streets of every village with a thousand inhabitants, or that they must maintain those public services which have brought the infant mortality rate down from 250 to 30 per thousand. But this change in ideas is not confined to the richer countries, and is not proportional to income per head. It has affected the poorer countries just as much, and it shows up in just as great an increase in the ratio of public expenditure in poor countries as in rich countries.

A second reason why we might expect the proportion spent on public services to rise is the relatively slow growth of productivity in this sector of the economy. This is best illustrated by making the extreme assumptions. Suppose that the number of policemen required varies directly with the output of commodities. Suppose also that while the total population, the number producing commodities, and the productivity of policemen remain constant, the productivity of those making commodities doubles, and so therefore does the output of commodities. It will follow that the number of policemen required will double. And if a policeman is paid the same as a producer of commodities it will also follow that the percentage

share of commodities received by policemen will double. It is hard to measure the productivity of services. Thanks to the typewriter, the telephone, the mechanical computer and other inventions, it has undoubtedly increased. But it is generally believed to have increased less than productivity in manufacturing or in agriculture, and to this extent the share of national income spent on public services would rise if these services were a function of output.

This brings us to the third point. Is the need for public services a function of output? To revert to our previous example, if the number of policemen needed is a function not of the output of commodities but of the number of men making commodities, and if the number of men is constant, and if policemen are paid the same as others, then the percentage share of policemen in commodity output will be constant whatever may happen to productivities, absolutely or relatively. Similarly if teachers are paid the same as other people, and if the ratios of teachers to children and of children to adults are constant, then the percentage share of teachers in the national income will be constant whatever may happen to productivity. Actually the ratio of children to adults is greater in poor countries, so if other things were equal the proportion of the national income spent on education would fall as productivity increased.

Assuming for the moment that public servants are paid on the average the same as other people, we can cut through this tangle by asking our question in the form: does the proportion of the population required in the public services vary with output per head? Different answers may be given for different services. As far as justice, police, and administration (narrowly defined) are concerned, there is no obvious reason why the proportion of men required should vary significantly with output per head, though there is possibly less voluntary public service in the richer communities, and correspondingly more people on the public payroll. (Cf. the amount of administration and of judicial work done by the "squire" in eighteenth century England). There is also greater expenditure on foreign missions, and on other representation in foreign countries—though the cost of this may be as much a function of size and

of status as it is of income. As for the economic services, the proportion of men required should on balance grow with income per head. The proportion required as agricultural extension workers should diminish as the farmers become more educated (and decline relatively in numbers) ; but the proportion engaged in maintaining roads, or water supplies or public works may be expected to increase. In the social services, the proportion required in education and in health is primarily a matter of policy. In one sense backward countries need relatively more spent on health and education because of the leeway to be made up, but in practice the numbers engaged in these services are relatively larger in rich than in poor countries.

It follows that we should expect the proportion of the population engaged in the basic public services to increase with income per head. Column *B* in Table I, however, shows that the difference in the proportion of national income spent on these services is relatively insignificant. Probably the main explanation of this paradox is the fact that a public servant usually costs more in relation to average income per head in poor than in rich countries. In Britain or the U.S.A., government employees receive an average income not very different from the average in the country. This is not so in the poorer countries. It is not merely that the higher civil servants and scientists cost relatively more, especially when these are imported from richer countries. There is also the mass of clerks, nurses, teachers and other subordinate grades. An elementary school teacher in Britain earns a salary about equal to that of an industrial worker, but an elementary school teacher in most poor countries (India is a notable exception) earns two or three times as much as the average farmer. As output grows and education spreads, the skills commanded by public servants become relatively less scarce, and their share of the national income would decline sharply but for the factors already mentioned which bring about a relative increase in numbers.

The importance of these factors comes out more clearly when we split "basic" expenditure into sub-groups, as is done in Table II. The exact meaning of the terms used can be found by reference to Table X and to the Appendix. Broadly speaking,

"Administration" excludes the economic departments—Agriculture, Commerce, Labour, etc.—which are included with public works and roads in "Economic."

TABLE II
"BASIC" CURRENT EXPENDITURE AS % OF G.N.P.

	(1) Administration	(2) Economic	Education	Health	Total
Tanganyika ...	3.87	3.83	1.70	1.28	10.68
Uganda ...	3.17	4.16	2.39	1.06	10.78
India ...	3.09	1.85	.77	.44	6.15
Nigeria ...	1.42	1.61	.78	.53	4.34
Ceylon ...	2.77	3.81	2.94	2.07	11.59
Gold Coast ...	2.56	3.58	3.06	1.23	10.43
Jamaica ...	2.89	3.44	1.99	2.06	10.38
British Guiana	3.24	4.08	2.19	1.93	11.44
Colombia ...	3.26	2.64	1.68	.84	8.42
Italy ...	3.76	3.96	2.99	2.08	12.79
Trinidad ...	3.23	4.49	2.24	2.46	12.42
France ...	3.32	3.88	1.97	1.62	10.79
U.K. ...	2.36	2.41	3.47	3.28	11.52
New Zealand	2.92	4.75	2.68	3.42	13.77
Sweden ...	3.07	3.35	4.27	2.57	13.26
U.S.A. ...	2.40	1.52	2.40	.92	7.24

(1) Row 1 in Table X.

(2) Rows 4 to 16 in Table X.

Table II shows that the proportions spent on administration and on economic services are relatively constant, while the proportions spent on education and on health vary considerably.

In the sub-group administration, 10 out of the 16 countries spend between 2.77 and 3.32 per cent. of G.N.P. The four which spend less than this include two poor ones (Nigeria and Gold Coast) and two rich ones (U.K. and U.S.A.); and the two which spend more are also widely separated (Tanganyika and Italy).

In both Nigeria and the Gold Coast much administration is done by chiefs, whose major source of income is from trade or farming or other payments which do not enter into the public accounts, so the figures do not fully measure the real resources used in administration. On the other hand, considerable expenditures on colonial development are hidden in the French figure for administration, which would otherwise be nearer to those of other countries at the richer end of the table.

In the economic sub-group, nine out of the sixteen countries spend between 3.35 and 4.16. New Zealand and Trinidad spend even more, in both cases because of much more than average expenditure on roads. On the other hand, in the cases of India, Nigeria, the U.K. and the U.S.A. some part of the relatively low figure is due to expenditure on ports, railways and other works either being done by private companies, or else appearing in separate budgets which are not incorporated in the general budget.

It is notable that, apart from housing subsidies (which are included in "Economic") the U.K. and the U.S.A. spend almost exactly the same proportions of G.N.P. on administration (2.36, 2.40) and on economic services (1.73, 1.52). The great differences between these two nations are to be found in their social services and in the categories excluded from Table II. Also, one must remember that the Federal Government finds it easier to finance some essentially civilian expenditures on the defence vote (*e.g.* research) so "basic" civil expenditure is rather larger than these figures show.

The fact that the Colombian figures are for 1947 should be borne in mind, since this was before the governments of under-developed countries got into the swing of their post-war development programmes. Unfortunately we have not had access to later Colombian figures, which are probably much higher, and which would be more fully comparable with the other figures in this article.

The expenditure on health varies most widely. Four countries spend less than 1.0, five spend between 1.0 and 2.0, five between 2.0 and 3.0, and two over 3.0. In general it is the richest countries which spend the most, but the fact that the U.S. spends less than 1.0 while Ceylon spends more than 2.0 emphasises that in this field policy is as important as income per head. The doctrine that it is the duty of the state to provide an adequate health service for all the citizens is very recent, and different countries have responded to it in widely differing degrees.

The duty to provide education is of much older recognition, and this expenditure varies less than health, though more than administrative or economic expenditure. The ten countries

which spend more than 2.00 include six of the seven richest, as well as British Guiana, Gold Coast, Ceylon and Uganda. India's expenditure is specially low because the average income of teachers is much closer to average national income in India than it is in other poor countries, but even with this allowance the figure is a reminder that India's large output of university graduates rests on a rather narrow base of primary and secondary education.

In all these figures India and Nigeria stand out for the poverty of their public services. Their expenditures are so small when compared with those of poorer countries (Tanganyika, Uganda) or of countries not so very much richer (Ceylon, Gold Coast) that they cannot possibly be explained in terms of national income per head. These low figures are due to large portions of these two countries having been governed until fairly recently by rulers who had low standards of public service. What they have in common is that they have both been ruled through native princes, who were left to decide for themselves what public services were required, and who remained steeped in mediæval notions of the functions of government. Outside the Indian States and the Nigerian Emirates the British Raj busied itself creating a modern framework of government, but in these two great areas the initiative was left to native rulers. The resulting figures for India and for Nigeria are the clearest proof that the proportion of national income spent on public services is a function not mainly of national income per head but of how "backward" or "progressive" are the rulers of the state.

(b) Other Current Expenditure.

The four items we have so far excluded are far more important in the budgets of the richer than of the poorer countries. These items are defence, public debt, social insurance and agricultural subsidies. If we exclude New Zealand, the U.S.A. and the countries of Europe, the total of these four items averages only 2.26 per cent. of G.N.P. in the remaining ten countries, whereas in New Zealand it is 10.23 per cent., and in the rest it ranges up to 22.48 per cent., which is twice as much as "basic" current expenditure.

There is least variation between countries in the cost of the public debt. It is less than 1.0 per cent. of G.N.P. in the African countries, in India and in Sweden (thanks to absence of wars). At the other extreme there is a big gap between the largest figure, the U.K.'s 4.77, and the next largest, New Zealand's 2.76. The U.S.A. has not fought such long wars as has the U.K., and is not so socialistically inclined as New Zealand; she escapes with 2.16 per cent. Italy and France have fought lengthy wars, but with less care to prevent inflation, so their debt costs only 1.97 per cent. of G.N.P. in each case.

One important conclusion is that several of the poorer countries have such small debt burdens that they could afford to finance much development by borrowing. Much the same conclusion was reached by Dr. Finch, who approached the matter via the balance of payments.¹

The leading country in the field of social insurance is New Zealand, which spends 7.98 per cent. of G.N.P. in this way. The U.K. and Sweden spend significantly less, respectively 5.84 and 5.59 per cent. Italy comes next with 4.33 per cent., followed by France 3.51 and the U.S.A. 3.49 per cent. Clearly policy is as important as degree of industrialisation in determining how much is spent in this way.

Finally, defence. This is an insignificant item in the British colonies and in Ceylon (0.50 per cent. of G.N.P. or less). It absorbs 1.43 per cent. in Colombia, 1.91 per cent. in India, 3.74 per cent. in New Zealand and also in Sweden, 5.33 per cent. in Italy, 9.49 per cent. in France, 9.89 per cent. in the U.K., and 13.90 per cent. in the U.S.A. Probably the U.S.A. figure for defence includes some civilian expenditures which the administration finds it convenient to classify under this head for political reasons.

Comparison between the U.S.A. and the U.K. will interest those U.K. taxpayers who are groaning under the burden of current expenditure totalling 34 per cent. of G.N.P. The U.K. spends roughly the same as the U.S.A. on administration and on economic services (apart from housing subsidies) and 4.0 per cent. of G.N.P. less on defence. It spends 1.1 per cent. more

¹D. Finch, "Investment Service of Under-developed Countries," *International Monetary Fund Staff Papers*, September, 1951.

on education, 1.3 per cent. more on food or agricultural subsidies, 2.4 per cent. more on health, 2.4 per cent. more on social insurance, and 2.6 per cent. more on public debt. Significant cuts in these expenditures are unlikely outside the fields of food subsidies and defence.

(c) *Capital Expenditure.*

Capital expenditure is less easy to compare than is "basic" current expenditure, because the extent to which governments provide for capital formation through the budget varies more widely. In Table III the expenditure is grouped under four sub-heads. "Departmental" in this table covers a wider range than "Administration" in Table II; it includes education, health and social insurance, and also economic departments, with the exception of those otherwise specified. "Transport" includes roads, and the whole of public works. "Finance" includes agriculture, water, industry and housing, which are the services where there is greatest variation in the extent to which finance is privately or publicly supplied.

TABLE III.
CAPITAL EXPENDITURE AS % OF G.N.P.

	(1) Departmental	(2) Transport	(3) Finance	Defence	Total
Tanganyika ...	1.27	1.24	1.45	.02	3.98
Uganda ...	2.37	2.17	2.17	.10	6.81
India ...	.21	.59	1.40	.10	2.30
Nigeria ...	.62	1.19	.49	.10	2.40
Ceylon ...	.98	1.91	4.30	.26	7.45
Gold Coast ...	1.80	4.03	2.28	.13	8.24
Jamaica ...	.60	1.48	1.96	—	4.04
British Guiana	1.62	1.58	2.76	—	5.96
Colombia ...	*	2.66	.55	—	3.21
Italy ...	.67	1.62	3.26	—	5.55
Trinidad ...	1.06	2.03	2.42	—	5.51
France ...	1.01	1.90	4.02	1.18	8.11
U.K. ...	1.24	.68	2.99	.46	5.37
New Zealand	1.56	2.40	4.31	—	8.27
Sweden ...	2.64	4.69	3.76	2.90	13.99
U.S.A. ...	1.18	.99	.71	1.38	4.26

(*) Included in Transport, which also includes some items of Finance.

(1) Rows 1, 2, 3, 13, 14, 15 and 17 in Table XI.

(2) Rows 4, 5 and 6 in Table XI.

(3) Rows 7, 8, 9, 10, 11, 12 and 16 in Table XI.

It is at once apparent from Table III how wide is the range of capital expenditures by governments—from 2·3 per cent. of G.N.P. in India to 14·0 per cent. in Sweden. The figures are misleading because they exclude the expenditures of those public agencies which do not appear in the budget, and these vary from country to country. For example, the capital expenditures of publicly owned railways, harbours or electric power stations are included in some cases and excluded in others, so the figures do not accurately state the total spending of public agencies. What they do state is the total spending for which the Minister of Finance holds himself responsible, in so far as his decision to include these figures in the budget indicates that he regards the financing of their expenditures as a part of his responsibility. They are therefore a good measure of the extent of the fiscal problem as he sees it.

The smallness of the "Departmental" and "Transport" expenditures is remarkable. The expenditures listed under "Administration," "Health" and "Education" in Table II account for about 70 per cent. of basic current expenditures. Yet these three together are slightly narrower than the category listed as "Departmental" in Table III, which takes typically much less than 2 per cent. of G.N.P. Basic current expenditures are mainly on administration, education, and health, but it is economic services which make the large drafts on capital expenditure.

The smallness of the capital expenditures on education and on health is particularly remarkable. The mean capital expenditure on education (the mean of row 2 in Table XI) is 0·5 per cent. of G.N.P. while the mean current expenditure (the mean of row 2 in Table X) is 2·3 per cent. of G.N.P. Similarly the mean capital expenditure on health is 0·3 per cent., whereas the mean current expenditure is 1·7 per cent. The capital expenditure may be understated, since some budgets hide expenditure on schools and health buildings under "public works," but this is probably not very significant. In making public expenditure programmes one of the maxims is that it is not safe to plan only in terms of capital expenditure because some of the items which look attractive because of their small capital requirements are in fact very expensive because of the

heavy commitment of current expenditures which they carry. The figures in Table III cannot be used to prove this by comparison with Table II, since Table III shows only gross additions to capital, while Table II shows current expenditures associated with all existing capital. But the maxim is undoubtedly relevant to education and to health.

Expenditure on roads is also remarkably small. The mean capital expenditure is 0.73 per cent. of G.N.P., and the mean current expenditure is 0.71 per cent. The largest combined expenditure is 2.69 per cent., which occurs in Sweden.

It is therefore clear that the extent of government capital expenditures depends mainly on how far the "productive" sectors of the economy—agriculture, transport, and industry—lean on the government for finance (and also on how much government finance goes into housing). This is not primarily a question of the extent to which these sectors are publicly owned, since publicly owned industries may raise their own finance privately in the capital market, while privately owned industries may be financed by loans from government sources.

The idea that the government should be a source of saving is relatively new. It follows from three policy objectives. First, the amount of private saving in under-developed countries is relatively small, and so also is the amount available through international investment. Hence, if a large investment programme is to be financed it must be through forced saving, and this is more equitably achieved through taxation than through inflation. Secondly some developed countries have exactly the same problem of a tendency for investment to exceed saving, and the prescription of a budget surplus to counter inflation in these circumstances is exactly the same solution reached by a different road. Thirdly, socialistic governments are anxious that new capital be created on public rather than private account, and since all capital is created out of saving the only way to prevent private fortunes from growing *pari passu* with capital formation is to finance capital out of public rather than private saving. Public ownership is not the antithesis of private wealth if, through dependence on private saving, all increase in publicly owned capital is matched by an increase in privately held government bonds.

The extent of public saving can be deduced by subtracting the total of current expenditures shown in Table X (row 21) from the total of current revenue shown in Table XII (row 12). This yields the results in Table IV.

TABLE IV.
PUBLIC SAVING AS % OF G.N.P.

Tanganyika	0.32	Colombia	1.07
Uganda	4.88	Italy	-1.05
India	-0.56	Trinidad	0.19
Nigeria	3.43	France	3.14
Ceylon	4.93	U.K.	3.09
Gold Coast	10.00	New Zealand	3.06
Jamaica	0.20	Sweden	9.82
British Guiana	3.38	U.S.A.	1.88

The figures in Table IV indicate the extent to which a country is "socialistic" in the sense of believing in public *ownership* (rather than in the sense of believing in public *control*, or in *equality* of income or of opportunity) since they show how much new capital is being created in the community without a corresponding increase of private wealth. On the other hand they somewhat understate the amount of public saving because they omit sinking fund contributions (which are in any case a small percentage of G.N.P.), investment by publicly owned enterprises financed out of their own savings, and, in the case of the African territories, grants from the statutory Marketing Boards for general development purposes (which are substantial).

Here again the range is remarkable. Even in 1953 there were two governments not raising enough revenue to cover even their current expenditures. The Gold Coast and Sweden stand out as the most "socialistic governments" with Ceylon, Uganda, Nigeria, British Guiana, France, U.K., and New Zealand following a long way behind.

(d) *A Frame of Reference?*

Does this analysis help to answer the question : what is the appropriate level and distribution of public expenditure in under-developed countries? The question cries out for an answer, if not in rigid quantitative terms, but at least in terms of some principles which may be used in judging government

programmes. Throughout the world Ministers and officials are busily engaged in working out five-year plans for public expenditure, and they look anxiously to economists and to others for guidance as to what is appropriate. Neither is there any lack of advice offered. The United Nations International Bank has sent out a succession of missions which have produced reports tendering such advice. Also many economists have sat on fiscal or other commissions reviewing public expenditure, and they seem usually to have been able to decide what levels were appropriate. But in none of the mass of published reports can one discover how the authors have decided what level or pattern of public expenditure was appropriate. Judgments in this sphere of public finance boil down to little more than personal assertions.

This analysis can make only one small contribution to the present situation—that of providing material with which to make comparisons. Such material does not enable the planner directly to answer the question: “Is my pattern right?”, but it does enable him to answer the question: “How does my pattern differ?”, and thereby sets him to seek the reasons for difference.

This contribution is most usefully summarised in a table showing the median and upper quartile expenditures of our sixteen governments in each category of expenditure. As we have already seen, the basic current expenditure of governments does not vary significantly with national income per head, so the median expenditures can be used as an indication of “standard” practice by a government seeking to achieve no more than “average” performance. Upper quartile expenditures indicate a more than average performance, though not the best (or most extravagant). However, since no government wishes to show more than average performance in every sphere of activity, the sum of the upper quartiles (13·18 current and 8·23 capital in Table V) exceeds the upper quartiles of total expenditure (12·01 current and 7·78 capital), and only Sweden and New Zealand surpass the upper quartile totals of spending.

TABLE V
COMBINED EXPENDITURE AS % OF G.N.P.

	Median			Upper Quartile		
	Current	Capital	Total	Current	Capital	Total
Administration ...	3.08	.42	3.50	3.25	.57	3.82
Education ...	2.32	.50	2.82	2.97	.73	3.70
Health ...	1.78	.27	2.05	2.27	.42	2.69
Water Supplies ...	.16	.31	.47	.29	.75	1.04
Public Works ...	.65	.39	1.04	.82	.45	1.27
Roads ...	.73	.68	1.41	.90	1.00	1.90
Transport ...	.64	.53	1.17	.85	1.03	1.88
Agriculture (1) ...	.98	.49	1.47	1.21	1.10	2.31
Industry (2) ...	.29	.31	.60	.44	.73	1.17
Housing ...	.11	.72	.83	.18	1.45	1.63
	10.74	4.62	15.36	13.18	8.23	21.41
Social Insurance ...	...	...	1.29			
Defence ...	...	...	1.09			
Public Dept. ...	...	...	1.10			
			<u>18.84</u>			

(1) Rows 7, 8, 10 and 11 in Table X and corresponding rows in Table XI. Irrigation is included but agricultural subsidies are excluded.

(2) Rows 12, 13, 14 and 15 in Table X and corresponding rows in Table XI.

Let us reiterate that Table V does not claim to show how any particular country must distribute its expenditure. For example, the appropriate expenditure on roads is probably relatively larger in a sparsely settled than in a densely settled country. The table is intended merely to stimulate enquiry into differences.

Table V shows that average performance takes 15.4 per cent. of G.N.P. for basic and capital expenditure, plus 3.5 per cent. for social insurance, defence and public debt, making a total of roughly 19 per cent. of G.N.P. Among the under-developed countries analysed here, this level of expenditure is attained by Uganda (19.1), British Guiana (19.8), Gold Coast (20.0), Trinidad (20.3) and Ceylon (21.8).¹ It seems not unreasonable to conclude that the governments of countries making a special development effort will find themselves spending between 19 and 22 per cent. of G.N.P.

¹These totals exclude agricultural subsidies.

As a by-product of this analysis, we can compare the expenditures proposed under India's Second Five-Year Plan with the figures in Table V. To do this we have to deduct development expenditure under the First Five-Year plan from the figures we have been using, and to add development expenditure under the Second Five-Year plan. The distribution of development expenditure in the year 1953-4 is given in the *Five-Year Plan Progress Report for 1953-4*, page 300. We have deducted this, and have added one-fifth of the proposed expenditure under the Second Five-Year Plan, as set out on page 35 of the *Draft Outline of the Second Five-Year Plan*.¹ The result gives the average public expenditure (ordinary plus development) contemplated under the Second Five-Year Plan. This is shown in Table VI as a percentage of the 1953/4 G.N.P. and compared with the Median expenditure taken from Table V.

TABLE VI
INDIA'S SECOND FIVE-YEAR PLAN AND
MEDIAN COMPARED

	India	Median	Difference
Administration	3.34	3.50	— .16
Education	1.35	2.82	—1.47
Health and Water ... ..	.94	2.52	—1.58
Agriculture and Irrigation ...	2.30	1.47	+ .83
Industry	2.80	.60	+2.20
Roads, Works and Transport ...	3.19	3.62	— .43
Housing ... ..	.18	.83	— .65
	14.10	15.36	—1.26

Two comments can be made on this comparison. First, there is furious debate in India on the question whether the total expenditure envisaged under the Plan is not too large. The answer to this question is "Obviously not." The proposed expenditure will merely bring India into line with such

¹In classifying the expenditure shown on page 35 of the *Draft Outline* it is assumed that half the expenditure on the Backward Classes and on Rehabilitation should be credited to Education. The other half is credited to Agriculture in the first case, and to Industry in the second case. But in making deductions from the 1953/4 figures it is assumed that the half which is here credited to Education was originally credited to Administration in the source from which we took the figures. Power is included in Industry.

countries as Tanganyika and Jamaica, and will leave her still far behind other progressive governments in Asia, in Africa and in the Caribbean. If it is contended that the expenditure is too large for the revenue-raising capacity of the Indian governments, the answer is simply that it is ridiculous for a government in the middle of the twentieth century to be raising less than 10 per cent. of G.N.P. in taxation, or to be claiming that it would be an intolerable burden or an insuperable task for the fiscal administration to raise as much as 15 per cent. But elaboration of this answer must wait for Section III of this paper.

The second feature which the comparison throws up is the great difference between the proportions in the Median and in the Indian proposals. India proposes to spend very much less on the "social" services, education, health and housing, and very much more on agriculture and industry. The proposed expenditure on industry is large only in the sense that in the countries included in our survey a larger part of the financing of industry is usually left to private enterprise. But the total capital investment in industry by public and private sources is not remarkable. The figures given in the draft outline amount to about 2.6 per cent. of G.N.P. for large scale industry (excluding power), to which one might add another 1.0 per cent. per annum for cottage industry. Comparable gross investment in the U.K. is consistently above 4 per cent. of G.N.P. Apart from industry, agriculture and the railways receive substantial provision, but the proposed expenditure on roads is almost incredibly small.

India's small expenditures on health and education distinguish her sharply from other progressive governments, and especially from the programmes of the new nationalist governments in Ceylon, in the Gold Coast, and in Nigeria.¹ In reply to the contention that economic expenditures should precede social service expenditures, politicians in these countries reply both that health and education expenditures are necessary for increasing the output of commodities, and also

¹The Nigerian figures in these tables are for 1952/3. The constitutional changes of 1953 have resulted in a very large increase of public expenditures, especially on health and on education.

that it is just as important to get rid of illiteracy and of disease as it is to provide more steel or cloth. Some West African politicians explain the difference mainly in terms of political structure. India, they say, is ruled by her upper classes, in a situation where caste and class differences are pronounced. Her rulers do what they think is best for the masses of her people, but they do not have to take much account of what the masses themselves think they want. West African society, on the other hand, is nearly classless. The masses have great political influence, and they make it clear that they value expenditures on health and education more than any other kind of government expenditure. In the final analysis there is no "model" which can show what government expenditure ought to be, without taking account of differing political pressures.

III. REVENUE.

We have seen that the government of an under-developed country needs to be able to raise revenue of about 17 to 19 per cent. of G.N.P., according to the extent of its defence burden, in order to give a not better than average standard of service. How it can be done, and is done, is the subject of this section.

Table VII summarises the information in Table XII by classifying the sources of revenue in three groups only. "Direct taxes" consists of income tax, poll tax, social insurance tax, land tax, rates and death duties. "Taxes on foreign trade" are shown separately, because it is much easier to raise large sums by way of import and export duties in countries where exports account for as much as 40 per cent. of G.N.P. than it is in those, such as India, where exports account for less than 10 per cent. of G.N.P. The remaining category consists of excise taxes, motor licences, earnings of government departments, interest and miscellaneous fees. Grants-in-aid and loans are not included in the table.

(a) *Direct Taxes.*

Much the most important direct tax is the income tax, with a yield ranging from 1.61 per cent. of G.N.P. in India to 13.52 in the U.K., 15.86 in the U.S.A. and 16.75 in Sweden.

TABLE VII
REVENUE AS % OF G.N.P.

	Direct Taxes	Taxes on Foreign Trade	Other Revenue	Total
Tanganyika ...	6.11	2.81	3.31	12.23
Uganda ...	3.71	10.36	3.07	17.14
India ...	2.51	1.53	4.24	8.28
Nigeria ...	1.94	4.51	1.96	8.41
Ceylon ...	5.49	10.80	3.06	19.35
Gold Coast ...	3.47	14.72	4.01	22.20
Jamaica ...	4.31	4.39	4.58	13.28
British Guiana ...	7.56	6.19	3.92	17.67
Colombia ...	4.22	1.99	6.66	12.87
Italy ...	7.09	1.27	15.17	23.53
Trinidad ...	6.87	3.60	5.26	15.73
France ...	9.47	1.99	17.44	28.90
U.K. ...	20.99	6.92	9.18	37.09
New Zealand ...	20.12	2.44	10.62	33.18
Sweden ...	19.63	1.68	12.00	33.31
U.S.A. ...	21.82	.18	7.31	29.31

(That the U.S. figure is larger than the U.K. is worth noting. Personal income tax rates are higher in the U.K., but taxes on profits, not set off against personal income tax, are much higher in the U.S.A. Paradoxically, in any debate on the alleged greater enterprise of business men in the U.S.A. most business men or economists offer the explanation that it is due to higher taxation of profits in the U.K.—a piece of inaccuracy which merely underlines how little we know about the effect of taxation on incentives).

Compared with the richer countries, the fundamental reason for the difficulty the poorer countries have in raising public revenue is their reluctance to levy adequate sums through the income tax. This reluctance is based on certain misconceptions.

First, it is sometimes believed that a poor country would have to tax relatively more people in order to raise the same proportion of the national income, but this is true only if the distribution of income is more equal in the poorer country. Income is probably more evenly distributed in West Africa than in Western Europe, because in West Africa the farmers all have access to land free of rent, or at negligible rents. On the

other hand, in the overcrowded parts of Asia a handful of landlords takes up to 50 per cent. of the farmers' output in rents, and the distribution of income is as uneven or more uneven than in Europe. The top 10 per cent. of the population receives as much or more of the national income, so an income tax falling on the top 10 per cent. should be capable of yielding just as large a percentage of the national income if comparable rates were charged.

Income tax yields much less because comparable rates are not charged, especially in the middle ranges of the income scale. The rates in the upper ranges are often quite high—for example in India, where nevertheless the income tax (including agricultural income tax) brings in only 1.61 per cent. of G.N.P. Taxes on profits may also be very high—for example, the standard rate is as high in British West Africa as in the U.K. The general practice in the poorer countries is to have high exemption limits for personal incomes, with generous allowances, so that even if the sum payable at £10,000 a year may be very substantial, the sum payable at £1,000 a year is usually only a token amount, compared with what would be paid in the U.K. The man earning £200 a year usually escapes altogether.

Now, in a country like India or Nigeria, a man earning £200 a year is extremely well off in comparison with the average income of the population, which is only about £60 a year per person gainfully occupied. Even the £100 a year man is definitely "middle-class," and a cut above his neighbours. The effect of present policies is to exempt practically the whole of the "middle-class" from paying income tax, and so the yield of the tax is bound to be small. In the U.K. the number of people paying income tax is equal to just over 30 per cent. of the population. In the U.S.A., where the allowances are greater, and where the gainfully occupied are relatively fewer, the number paying income tax equals 25 per cent. of the population. The percentage in Jamaica is 2.1, in Trinidad 1.8, in British Guiana 1.4, and in Ceylon 0.6.

Present policies also have the effect that the middle-class pays proportionally less of its income in taxation than the poorer classes, on whom the incidence of indirect taxation is relatively heavier. The Colwyn Committee showed that this

was happening in the U.K. in 1925, when U.K. allowances were similarly generous.¹ According to Dr. Das Gupta this was also the situation in Ceylon in 1942, though the difference is not now so pronounced.² There is also evidence that it is the situation in urban areas in India.³ Such a policy is particularly inequitable in under-developed countries since in these countries the £100 to £500 a year man benefits more from public expenditure than the rest of the population. It is his children who get educated in the state schools, and his family that uses the hospitals. Most of the poorer people in the countryside are outside the reach of these services, and most of the richer use private schools, private nurses and private doctors. It is therefore quite unjustifiable morally to exempt this class from paying direct taxation.

Objection is sometimes made on the ground that it is costly to collect small sums from large numbers of persons, but the importance of this is grossly exaggerated. It is traditional in Asia and Africa to levy a direct tax upon nearly every adult—the land tax in Asia and the poll tax in Africa—and the cost of collection has been small. The average sum paid by each taxpayer is smaller than in Europe, but so also is the average salary of the tax collector. It is not differences in the cost of collection that explain why only 0.6 per cent. of the population pays income tax in Ceylon, compared with 25 per cent. in the U.S.A.

Apart from the income tax, the yield of other direct taxes is bound to be small in under-developed countries, though it might be larger than it is. Death duties are bound to be small because the ratio of capital to income is low. Assuming that the country's capital (including land) is worth 1.5 times its G.N.P., the amount becoming liable for death duties in any year (which depends on the death rate) would be only 3 or 4 per cent. of G.N.P., so even rates of duty comparable to those of the U.K. would not yield much more than 0.8 per cent. of G.N.P. The

¹*Report of the Committee on National Debt and Taxation*, Cmd. 2800, 1927, p. 96.

²*Report of the Taxation Commission*, Colombo, 1956, page 52. This Report quotes Dr. Das Gupta's conclusion.

³*Report of the Taxation Enquiry Commission*, New Delhi, 1955, Vol. I, p. 69.

case for higher death duties in these countries must rest on political and equity considerations rather than on the prospect of raising revenue. The land tax used to raise 1.25 per cent. of G.N.P. in India before the war, but now raises only 0.66 per cent., inflation having proceeded faster than re-assessment. If it were politically acceptable to classify all rural land into four or five rough grades of potential fertility, the process of assessment would be greatly simplified and accelerated, without grave injustice. But such a simple reform is contrary to a tradition of making a lengthy, detailed, and expert assessment of every acre. Finally, there is the social insurance tax, which yields as much as 6.4 per cent. of G.N.P. in New Zealand. However, since social insurance payments usually grow faster than the yield of this tax, it does not contribute towards the cost of "basic" services in any of our sixteen countries. Unless the income tax rates are sharply increased in the middle income ranges, the poorer countries will have to continue to rely mainly on indirect taxation.

(b) Taxes on Foreign Trade.

Taxes on foreign trade are popular with governments because of the ease with which they can be collected, and because they are a means of levying taxation even upon the poorest citizens. Their protectionist function, which is considered important in developed countries, is seldom significant in the less developed.

Import duties raise on the average 3.59 per cent. of G.N.P. in the nine poorest countries in our survey. The lowest figure is 1.14 per cent. in India, where imports are only 5.7 per cent. of G.N.P., and the highest is 5.77 per cent. in the Gold Coast, where imports are 35.6 per cent. of G.N.P. The average rate of the tax is therefore 20 per cent. in India, and 16 per cent. in the Gold Coast.

Heavy taxation of exports is entirely a post-war phenomenon, and is confined to Ceylon, Uganda and the Gold Coast, where export duties raise respectively 5.78, 7.02, and 8.95 per cent. of G.N.P. (not including the profits and reserves of statutory marketing agencies). In the remaining six of the nine poorest countries the average is only 0.55 per cent. of G.N.P.

The purpose of levying these high duties has been to take advantage of some extraordinary increases of prices. For example, in the Gold Coast before the war a price of £30 per ton for cocoa was considered good. Allowing for the average trebling of commodity prices, a post-war price of £100 a ton would have been considered good. Actually the post-war price soared for a time as high as £500 per ton, and even now, when it is thought to be low, it exceeds £200 per ton. Essentially the governments' object has been to siphon off some of these windfall profits into the public purse.

This policy has been criticised on the ground that it is unfair to pick on a small section of the farming community for such heavy taxation ; but it is equally arguable that the man most able to bear taxation is he who has received a sudden windfall increase in his profits. It is also objected that this high taxation has diminished private saving. This is true, but it has also much more than correspondingly increased public saving. Much money which the farmers would otherwise have spent on Cadillacs and on other forms of conspicuous consumption has gone instead into water supplies, electric power stations, and schools.

More serious is the possible long-term effect of such high taxation of a few commodities. It would be foolish to keep the net price to the farmer so low that he finds other crops more profitable—the Gold Coast has avoided this error, but Uganda has not. In the long run one may expect the prices of these commodities in the world market to come into line with the prices of other commodities, so that there is no longer a windfall margin to be taxed. It is a sensible policy to tax away part of the windfall while it lasts, but the governments in this favoured position ought to be preparing to cultivate other sources of taxation, since it is improbable that they will for long be able to rely on such substantial contributions from a few favoured exports.

One permanent legacy of these interludes is that they have shown the value of basing export duties upon a sliding scale varying with the commodity's price. The value of this system does not lie mainly in its contribution to the public revenue, since it makes export duties a very unstable source of revenue,

and since what is gained in the boom may well be lost in the slump. Its value lies rather in that it helps to stabilise the economy internally. In the absence of such arrangements the internal price levels of these countries are dragged up and down in the wake of external prices, which may move 50 per cent. in either direction within twelve months, and the strain of pushing up wages and trying to get them down again does considerable unnecessary harm to industrial relations.

(c) *Other Revenue.*

The only other large source of revenue is excise duties, raising an average of 1.94 per cent. of G.N.P. in the nine poorest countries, and an average of 6.28 per cent. in the seven richest, with France achieving the peak of 12.09 per cent. The main reason for this big difference is the adoption of sales and purchase taxes in many of the richer countries, a form of taxation which is now spreading into the under-developed countries.

If an under-developed country needs to raise some 15 to 20 per cent. of G.N.P. in revenue, and cannot rely on a large yield from taxing foreign trade, the adoption of some form of sales tax is inevitable. A general sales tax is not as difficult to collect as one might think. One begins by registering all the people who have to pay it—manufacturers, wholesalers, and retailers. The larger units have in any case to submit their accounts for income tax purposes, so it costs little to extract the sales tax from them. One draws a line below which small traders are not assessed individually—say a turnover of £1,000 a year—and levies instead on these traders a lump sum tax of say £5 a year if the sales tax is one-half of one per cent.

If a commodity passes through several hands before reaching the final consumer, a sales tax levied each time it changes hands must encourage vertical integration. Such a tax is known as a multi-point sales tax, whereas a tax which is paid only once is known as a single-point sales tax. A multi-point sales tax is attractive because the opportunities of evading it are less than the opportunities of evading a single-point sales tax, since the single-point sales tax has to distinguish between sales which are taxed and sales which are not taxed, and this

opens up loopholes for evasion. On the other hand, a multi-point sales tax would be a pronounced encouragement to vertical integration unless it were small, so in effect a multi-point sales tax can hardly be more than 0.5 per cent. This in turn means that it cannot yield much revenue. If one needs to raise 4 or 5 per cent. of G.N.P. through a sales tax, as India will have to do, one must choose instead a single-point sales tax of around 10 per cent. The problem is then to prevent evasion. The system works by keeping a register of all those who are liable to pay the tax, and by taxing all their sales except sales to other people on the register. Some sellers then produce false receipts purporting to be from other people on the register, and some fraudulent evasion is inevitable, however busy the tax inspectors may be. But, in a country which has little foreign trade, what is the alternative to taxing domestic trade? The answer implicit in India's *Draft Outline of the Second Five-Year Plan* is: "Inflation." But most economists would agree that a proper exploitation of available sources of taxation should have priority.

(d) *A Frame of Reference?*

When we were dealing with expenditure it was easy to construct a tentative frame of reference for under-developed countries by taking the medians and upper quartiles, since the differences between countries at different levels of development were not large. This cannot be done on the revenue side since the difference here is tremendous owing to differences in the burden of defence.

The frame of reference for expenditure gives some indication of the revenue required. Assuming median levels of expenditure, it is 18 to 20 per cent. of G.N.P., according to the burden of defence. Some of the capital formation can be financed by borrowing, but having regard to the low availability of international loans; and to the fact that private domestic saving is itself inadequate to finance an appropriate level of private investment; and to the fact that the private sector leans on government agencies for some finance, especially for agriculture, for factories and for housing; the minimum target of the government of an under-developed country should

be to save enough to finance its own capital expenditures. Of course, if these governments receive substantial grants-in-aid from other countries their fiscal task will be lightened, but the immediate prospect for substantial international aid is not bright.

Assuming that a government needs to raise 20 per cent. of G.N.P., and is not able to rely on taxing windfalls in export trade, the following "model" is tentatively suggested :

Income tax	...	...	...	...	...	8.0
Land tax, rates	...	...	...	...	...	1.5
Death duties	...	...	...	...	...	0.5
Export duties	...	...	...	...	...	1.0
Import duties, excise, sales tax	...	...	...	...	...	7.0
Earnings, fees, interest	...	...	...	...	...	2.0
						<hr/> 20.0 <hr/>

This division is based on one of Mr. Gladstone's canons of finance : that the revenue should come about equally from direct and from indirect taxes. Our goal for consumption taxes, 7.0 per cent. of G.N.P., is not far removed from current practice, since the mean sum raised by the nine poorest countries in import duties and excise taxes is already 5.53 per cent. In fact this goal is already nearly reached by Ceylon (6.12), by Colombia (6.18), and by Trinidad (6.84), and is passed by the Gold Coast (7.29), by Jamaica (7.46) and by British Guiana (7.55). The big increase in our "model" is in the income tax, since our goal of 8.0 per cent. compares with a mean of 3.59 per cent. raised by the nine poorest countries. The three under-developed countries nearest to this goal are Tanganyika (5.21), Trinidad (6.08) and British Guiana (6.97).

IV. LOCAL GOVERNMENT FINANCE.

The people of under-developed countries will not willingly pay higher taxes unless they can see the fruit in additions to those categories of public service which they value, which are more especially roads, water supplies, medical services, schools and electric power. They will also pay more willingly if they can play a part in planning the services of their own locality, instead of depending on plans made in a distant capital city. Hence it is important to have the right balance of central and

local expenditures, and also of central and local taxation. In another context the difficulties produced by an inappropriate balance can be seen in acute form in India, where the initiative to step up the expenditure programmes comes from the centre, but where the three taxes which could add most to the revenue (the agricultural income tax, the sales tax and the land revenue) are controlled by the states, who are reluctant to increase taxation.

(a) *Expenditure.*

Table VIII summarises the information given in Tables XIII and XIV. Current and capital expenditure are combined in this table. The categories are the same as in Table II, except that an additional column "other" is added for expenditure on social insurance, defence, and public debt. The expenditure of the regions in Nigeria and of the states in India and in the U.S.A. is included.

TABLE VIII
LOCAL GOVERNMENT EXPENDITURE AS % OF G.N.P.

	Administration	Economic	Education	Health	Other	Total
Tanganyika ...	1.18	.20	.31	.31	—	2.00
Uganda ...	.71	1.01	.45	.12	.03	2.32
India ...	2.59	2.93	.72	.42	.38	7.04
Nigeria ...	.73	1.42	.74	.55	.31	3.75
Ceylon ...	.40	.37	—	.07	.04	.88
Gold Coast ...	.77	.49	.36	.40	.03	2.05
Jamaica ...	.33	.46	—	.27	.56	1.62
British Guiana	.30	.95	—	.20	.10	1.55
Colombia ...	1.65	1.70	1.09	.41	1.23	6.08
Italy ...	1.54	2.14	.51	1.13	1.06	6.38
Trinidad ...	.27	.67	—	.44	—	1.38
France ...	1.49	2.66	.36	1.02	.75	6.28
U.K. ...	1.16	4.24	3.38	.38	.93	10.09
New Zealand	1.11	2.66	—	.22	.30	4.29
Sweden ...	3.06	5.53	3.60	2.68	1.17	16.04
U.S.A. ...	1.44	2.16	2.83	.96	1.59	8.98

The figures must be treated with reserve. It is not possible to be certain that one has got hold of the figures of each of several thousands of local authorities, and in several cases expenditures on capital account have not been obtainable (whether because there are no such expenditures, or because

they are included in the current accounts or because we could not find a source). Errors here make little difference to the aggregates in Tables II and III; but they are of course of greater significance for Table VIII.

The main conclusion, however, is not obscured by the shakiness of some of the figures. This is : that the weakness of local government in relation to central government is one of the most striking phenomena of under-developed countries. In Ceylon, in Africa and in the West Indies the central government directly controls the major part of the public service. This weakness of local government is particularly marked in relation to education. Only in the U.K., Sweden, and the U.S.A. do local authorities play a significant role in the education system ; in five countries they play no role at all. On the other hand, except in Nigeria (where the powers of the regional governments were substantially increased in 1953 under a new federal constitution) the countries where the local governments spend less than 6 per cent. of G.N.P. are all small, and the fact that New Zealand is included among them suggests that the absence of strong subordinate authorities may be due to their size rather than to their state of development. Nevertheless one retains the impression that the size of some of these countries, especially in Africa, would justify greater regional devolution, and it is interesting to note that this has become a major political issue in some of them.

(b) *Revenue.*

To construct Table IX we have first arranged countries in order of the percentage of G.N.P. accruing as revenue to subordinate authorities (including grants), and we have then averaged the receipts of the first four, the second four, and so on. For example, the first four (*i.e.* those receiving least) are Ceylon, Trinidad, Jamaica and British Guiana. They receive in land tax and rates respectively 0.32, 0.27, 0.78 and 0.43 of G.N.P. The average of these figures, 0.45, is entered in row one, column one of Table IX.

TABLE IX
SOURCES OF LOCAL REVENUE AS % OF G.N.P.

	First Four	Second Four	Third Four	Fourth Four
Land tax, rates	·45	·70	·52	2·07
Income and poll tax	·19	·47	·63	1·75
Excise duties	—	·10	1·55	·91
Grants from centre	·33	·61	1·11	1·79
Other revenue	·43	·62	·66	2·73
Total	1·40	2·50	4·47	9·25

A tax on land or houses is the most popular source of local revenue ; it is the only tax which is levied at the local level by all the sixteen countries in our survey. It is usually also the largest single source of revenue. Next in popularity (with governments if not with taxpayers) is a local income tax, levied by nine of our countries. Local excise duties do not normally bring in a substantial revenue. Grants from the central government usually account for between 20 and 25 per cent. of the revenues of subordinate authorities.

ALISON MARTIN
W. ARTHUR LEWIS

University of Manchester.

TABLE X.—CURRENT EXPENDITURE AS % OF GROSS NATIONAL PRODUCT

	Tanganyika	Uganda	India	Nigeria	Ceylon	Gold Coast	Jamaica	Br. Guiana	Colombia	Italy	Trinidad	France	U.K.	New Zealand	Sweden	U.S.A.
1. Administration	3.87	3.17	3.09	1.42	2.77	2.56	2.89	3.24	3.26	3.76	3.23	3.32	2.36	2.92	3.07	2.40
2. Education	1.70	2.39	.77	.78	2.94	3.06	1.99	2.19	1.68	2.99	2.24	1.97	3.47	2.68	4.27	2.40
3. Health	1.28	1.06	.44	.53	2.07	1.23	2.06	1.93	.84	2.08	2.46	1.62	3.28	3.42	2.57	.92
4. Roads	.71	.74	.22	.23	.51	.92	.82	.87	.39	.55	1.13	.78	.70	1.18	1.05	.63
5. Transport	.59	.37	.12	.31	.83	.41	.68	1.09	1.00	.75	.89	.86	.10	.72	.45	.27
6. Public Works	.74	.96	.53	.53	.55	.55	.50	.35	.79	1.01	.80	.82	—	.94	—	.03
7. Agriculture	1.09	.86	.41	.23	.43	.80	.58	.46	.23	.61	.55	.23	.24	.54	.72	.23
8. Drainage	—	.02	.24	—	.24	—	.05	.55	—	—	.13	—	.08	.10	—	—
9. Water Supplies	.14	.44	—	.07	.16	.27	.09	.32	—	—	.20	.05	.32	.14	.23	.08
10. Land Settlement	.33	.35	—	.10	.57	.18	.30	.28	—	.38	.34	.25	—	.45	.24	—
11. Co-operatives	.03	.07	.06	.01	.14	.03	.02	.03	—	—	.04	—	—	—	—	—
12. Industry	—	.05	.27	.05	.20	.11	.04	—	.12	.16	.12	.29	.16	.21	.17	—
13. Commerce	.02	.05	—	.06	.02	.12	.07	—	—	.36	.09	.37	—	—	—	.02
14. Mining	.09	.08	—	.02	.02	.04	.01	.06	.03	—	.02	—	—	.01	.06	.01
15. Labour	.07	.12	—	—	.13	.05	.04	.05	.08	.14	.08	.12	.12	.28	.30	.08
16. Housing	.02	.05	—	—	.01	.10	.24	.02	—	—	.10	.11	.69	.18	.13	.17
17. Agricultural Subsidies	.13	—	—	—	.04	.46	.14	.50	—	.16	.79	—	1.98	1.87	.09	.64
18. Social Insurance	.50	.60	.18	—	1.24	.43	1.07	1.26	.56	4.33	1.17	3.51	5.84	7.98	5.59	3.49
19. Defence	.27	.45	1.91	.50	.49	.48	.14	.06	1.43	5.33	.03	9.49	9.89	3.74	3.74	13.90
20. Public Debt.	.33	.43	.60	.14	1.06	.40	1.35	1.03	1.39	1.97	1.13	1.97	4.77	2.76	.81	2.16
21. Total	11.91	12.26	8.84	4.98	14.42	12.20	13.08	14.29	11.80	24.58	15.54	25.76	34.00	30.12	23.49	27.43

TABLE XI.—CAPITAL EXPENDITURE AS % OF GROSS NATIONAL PRODUCT

	Tanganyika	Uganda	India	Nigeria	Ceylon	Gold Coast	Jamaica	Br. Guiana	Colombia	Italy	Trinidad	France	U.K.	New Zealand	Sweden	U.S.A.
1. Administration	.40	.81	.20	.01	.16	.42	.21	.60	—	.44	.35	.41	.57	.52	.65	.24
2. Education	.53	1.15	—	.46	.39	.69	.32	.15	—	.15	.24	.48	.52	.76	1.13	.66
3. Health	.32	.34	.01	.09	.36	.58	.06	.64	—	.05	.47	.06	.13	.14	.36	.27
4. Roads	1.02	.97	.02	.30	.43	1.29	.60	.46	1.02	.37	1.24	.54	.09	.76	1.64	.90
5. Transport	.12	.19	.29	.47	1.09	2.49	.43	.76	.46	.82	.24	.96	.59	1.29	2.89	.08
6. Public Works	.10	1.01	.28	.42	.39	.25	.45	.36	1.18	.43	.55	.40	—	.35	.16	.01
7. Agriculture	.38	.80	.02	.06	1.15	1.00	.54	.74	.34	.87	.06	.57	.04	.59	.32	.24
8. Drainage	—	.03	.32	—	1.55	—	.22	1.01	—	.47	.21	—	.10	.09	—	—
9. Water Supplies	.80	.46	.68	.17	.12	.75	.30	.10	—	.18	1.81	.15	.36	.10	1.57	.31
10. Land Settlement	.03	.09	—	.01	.15	.03	.09	.08	—	.44	.13	—	—	.45	—	—
11. Co-operatives	—	—	—	—	—	.01	.01	.11	—	—	—	—	—	—	—	—
12. Industry	—	.03	.38	.25	1.04	.49	.09	—	.21	.58	—	1.48	.91	1.70	.35	—
13. Commerce	—	.02	—	—	.01	.09	—	—	—	—	—	—	—	—	.38	.01
14. Mining	.02	.05	—	.06	—	.01	.01	.23	—	.03	—	.06	—	.14	—	—
15. Labour	—	—	—	—	.01	.01	—	—	—	—	—	—	—	—	—	—
16. Housing	.24	.76	—	—	.29	—	.71	.72	—	.72	.21	1.82	2.38	1.38	1.52	.16
17. Social Insurance	—	—	—	—	.05	—	—	—	—	—	—	—	.02	—	.12	—
18. Defence	.02	.10	.10	.10	.26	.13	—	—	—	—	—	1.18	.46	—	2.90	1.33
19. Total	3.98	6.81	2.36	2.40	7.45	8.24	4.04	5.96	3.21	5.55	5.51	8.11	5.37	8.27	13.99	4.26

TABLE XII.—REVENUE SOURCES AS % OF GROSS NATIONAL PRODUCT

	Tanganyika	Uganda	India	Nigeria	Ceylon	Gold Coast	Jamaica	Br. Guiana	Colombia	Italy	Trinidad	France	U.K.	New Zealand	Sweden	U.S.A.
1. Income Tax	5.21	3.34	1.61	1.75	4.72	2.73	3.24	6.97	2.78	4.54	6.08	7.82	13.52	10.41	16.75	15.86
2. Social Insurance	...	...	...	...	.26	.04	.07	...	...	.37	...	.48	3.39	6.40	.53	2.78
3. Land Tax	...	...	.90	.19	.42	.70	.87	.48	1.15	1.22	.56	.97	2.92	2.19	2.18	2.84
4. Death Duties	...	.02	...	...	.09	...	.13	.11	.29	.96	.23	.20	1.16	1.12	.17	.34
5. Export Duties	...	7.02	.39	2.07	5.78	8.95	...	.66	.04	1.07	.04	.08	...	...	.56	...
6. Import Duties	2.69	3.34	1.14	2.44	5.02	5.77	4.39	5.53	1.95	.20	3.56	1.91	6.92	2.44	1.12	.18
7. Excise Duties	1.37	1.26	2.14	.76	1.10	1.52	3.07	2.02	4.23	9.07	3.28	12.09	4.82	4.43	5.25	5.05
8. Motor Licences	.23	.09	.12	.12	.20	.16	.16	.13	.11	.26	.29	.08	.49	.88	.52	.44
9. Govt. Dept. Earnings	.50	.81	.86	.40	.27	.42	.32	.52	.48	3.02	.36	.98	2.13	2.62	2.02	.45
10. Miscellaneous Fees	.97	.57	1.02	.29	1.23	.93	.96	1.06	1.84	2.53	1.14	3.21	.60	1.70	3.64	1.14
11. Interest	.24	.34	.10	.39	.26	.98	.07	.19	...	.29	.19	1.08	1.14	.99	.57	.23
12. Total	12.23	17.14	8.28	8.41	19.35	22.20	13.28	17.67	12.87	23.53	15.73	28.90	37.09	33.18	33.31	29.31

TABLE XIII.—LOCAL CURRENT EXPENDITURE AS % OF GROSS NATIONAL PRODUCT

	Tanganyika	Uganda	India		Nigeria		Ceylon	Gold Coast	Jamaica	Br. Guiana	Colombia	Italy	Trinidad	France	U.K.	New Zealand	Sweden	U.S.A.	
			States	Local	Regions	Local												States	Local
1. Administration ...	1.18	.71	1.96	.37	.42	.31	.40	.55	.33	.24	1.65	1.54	.27	1.38	.97	1.03	2.41	.31	.95
2. Education ...	.31	.39	.56	.16	.47	.10	—	.26	—	—	1.09	.51	—	.08	2.91	—	2.65	.40	1.79
3. Health ...	.31	.05	.32	.09	.32	.14	.07	.29	.27	.20	.41	1.13	.44	1.02	.36	.22	2.32	.29	.45
4. Roads ...	.11	.18	—	—	.05	.10	.09	.25	.29	.18	.07	—	.64	.78	.62	.66	.62	.20	.41
5. Transport ...	—	.01	.03	.05	—	—	—	.01	.07	.07	.10	—	—	.20	—	.08	.45	.01	.08
6. Public Works ...	—	.18	.48	.14	.17	.10	.15	—	.01	—	.47	.62	—	.82	.01	.32	—	.01	.02
7. Agriculture ...	.09	.06	.38	—	.16	.05	—	.02	—	.01	—	—	—	—	.08	.11	—	.13	.05
8. Drainage ...	—	—	.23	—	—	—	—	—	—	.11	—	—	—	—	.08	.11	—	—	—
9. Water Supplies ...	—	.02	—	—	.03	.03	.13	.08	.07	.32	—	—	—	—	.32	.17	.23	.01	.03
10. Land Settlement ...	—	.01	—	—	.05	.03	—	—	—	—	—	—	—	.25	—	—	.24	—	—
11. Co-operatives ...	—	—	.06	—	.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12. Industry ...	—	—	.15	—	.01	.03	—	—	.02	—	—	1.52*	—	.26	—	.01	—	.06	—
13. Housing ...	—	—	—	—	—	—	—	—	—	.02	—	—	.01	—	.15	.03	—	—	.03
14. Social Insurance ...	—	.03	.15	—	—	—	.04	.01	.38	.02	.46	.90	—	.52	.12	—	1.12	.88	.50
15. Defence ...	—	—	—	—	.22	.09	—	—	—	—	—	—	—	—	—	—	—	.02	—
16. Public Debt. ...	—	—	.21	.02	—	—	—	.02	.18	.08	.77	.16	.02	.23	.81	.30	.05	.05	.14
17. Total ...	2.00	1.64	4.53	.83	1.91	.98	.88	1.49	1.62	1.25	5.02	6.38	1.38	5.54	6.35	3.04	10.09	2.37	4.45

* Appears as "Economic and Productive." In Table X it has been split between 4, 5, 7 and 10.

TABLE XIV.—LOCAL CAPITAL EXPENDITURE AS % OF G.N.P.

	Uganda	India States	Nigeria		Gold Coast	Br. Guiana	Colombia	France	U.K.	New Zealand	Sweden	U.S.A.	
			Regions	Local								States	Local
1. Administration ...	—	.26	—	—	.22	.06	—	.11	.19	.08	.65	.03	.15
2. Education ...	.06	—	.13	.04	.10	—	—	.28	.47	—	.95	.09	.55
3. Health ...	.07	.01	.06	.03	.11	—	—	—	.02	—	.36	.07	.15
4. Roads ...	.05	.01	.09	.04	.10	.16	.20	.08	.08	.48	.59	.63	.26
5. Transport ...	.01	—	—	—	—	—	.06	—	.03	.01	.50	.01	.01
6. Public Works ...	.45	.13	.16	.10	—	—	.70	.27	—	.39	.16	.01	.01
7. Agriculture ...	.01	.01	.04	.01	—	—	.10	—	—	.08	—	.02	—
8. Drainage ...	—	.32	—	—	—	—	—	—	.10	.09	—	—	—
9. Water Supplies ...	.01	.63	.15	.01	.03	.08	—	—	.36	.11	.78	—	.01
10. Industry ...	—	.31	—	—	—	—	—	—	.10	—	.53	—	—
11. Housing ...	.02	—	—	—	—	—	—	—	2.39	.01	1.43	—	.16
12. Total ...	.68	1.68	.63	.23	.56	.30	1.06	.74	3.74	1.25	5.95	.86	1.30

TABLE XV.—LOCAL REVENUE SOURCES AS % OF GROSS NATIONAL PRODUCT.

	Tanganyika	Uganda	India		Nigeria		Ceylon	Gold Coast	Jamaica	Br. Guiana	Colombia	Italy	Trinidad	France	U.K.	New Zealand	Sweden	U.S.A.	
			States	Local	Regions	Local												States	Local
1. Income Tax ...	.74	1.14	.58	.01	.06	.68	.07	—	—	.68	—	1.18	—	—	—	—	6.44	.54	.03
2. Social Insurance ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.75	.09
3. Land Tax ...	.39	.03	.67	.22	.03	.09	.32	.59	.78	.43	.49	.59	.27	.44	2.93	1.98	2.06	.15	2.68
4. Death Duties ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.07	—
5. Excise Duties ...	—	.37	1.34	.05	.01	—	—	.03	—	—	2.99	1.80	—	1.49	—	—	.08	1.87	.21
6. Motor Licences ...	—	—	.12	—	.09	—	.06	—	.11	—	.11	.07	—	—	—	.20	—	.29	.15
7. Govt. Dept. Earnings...	—	—	.68	—	.05	.10	—	.03	.01	.14	.48	.04	.01	—	1.31	.23	1.40	.30	—
8. Miscellaneous Fees ...	.30	.27	.50	.28	.03	.18	.16	.36	.24	.34	1.02	.54	.35	2.56	—	.86	2.90	.34	.70
9. Interest ...	—	.04	.08	—	.09	—	—	.01	—	.01	—	.22	—	—	.04	—	—	.04	—
10. Grants from Central G.	.47	.44	.43	.17	2.59	.05	.37	.93	.40	.09	.36	.82	.76	1.45	2.75	.59	2.08	.77	.09
11. " " States ...	—	—	—	—	—	.16	—	—	—	—	—	—	—	—	—	—	—	—	1.62
12. " " Local Gov. ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.06	—
13. Total ...	1.90	2.29	4.40	.73	2.95	1.26	.98	1.95	1.54	1.69	5.45	5.26	1.39	5.94	7.03	3.86	14.96	5.18	5.57

STATISTICAL APPENDIX

Tables I to VII and X to XII show the combined expenditures and revenues of central and local governments, excluding inter-governmental transfers. Tables VIII, IX and XIII to XV are for "local" authorities only, including states and other constituent units of federations.

I. Expenditure Classification.

Public utilities are excluded unless their accounts appear in government budgets. They are then included net ; deficits appear in the expenditure tables (posts and telecommunications in Transport, electricity in Industry, etc.), and surpluses in the revenue tables.

Refunds of revenue which appear as expenditure in the budgets are here excluded from expenditure and deducted from revenue.

Administration includes all administrative and legislative expenditure except the administrative expenditure of the education, health and economic departments specified below. It includes tax collection and accounting, prisons, police, printing, fire service and miscellaneous expenditure not elsewhere specified. Pensions are shown in Social Insurance.

Education includes universities, technical colleges (not agricultural) and adult education.

Health includes hospitals, sanitation, and medical services, but not health insurance.

Roads includes public lighting.

Transport includes railways, civil aviation, mercantile marine, harbours, posts and telecommunications. Current accounts include only deficits on these services, unless they are organised as separate agencies, in which case the administrative expenditures of the departments responsible for supervising them are also shown. Capital expenditures are shown only in so far as the budget provides for them.

Public Works includes buildings and works not elsewhere specified. Where several categories are included in the budget of a "Public Works Department" the administrative expenditure of the department is divided proportionally between them.

Agriculture includes fishing, veterinary services, and tsetse control, but excludes subsidies and grants to farmers ; these are shown separately.

Drainage includes irrigation and coast protection.

Water supplies includes sewerage, but excludes irrigation and power.

Land settlement includes forestry, lands and surveys.

Industry includes electricity and gas.

Commerce includes expenditure on trade promotion.

Mining includes geological surveys.

Labour includes employment services, but not unemployment insurance.

Housing includes rehabilitation measures.

Agricultural subsidies includes all food subsidies and all grants or subsidies to farmers or losses on farm support programmes.

Social insurance includes all civil and military pensions, public assistance, and social security benefits.

Defence includes all military expenditures, but not police.

Public debt includes interest and sinking fund payments, but not repayment of debt.

The term *Basic Expenditure* is applied to all categories except the last four named above.

2. Revenue Classification.

Reimbursements of revenue are excluded ; so are loans ; and so are grants received from other countries.

Income tax includes personal and company taxes, excess profits tax, education tax, agricultural income tax, and poll tax.

Social insurance includes contributions to pensions, and superannuation.

Land tax includes rates, land revenue.

Death duties includes legacy duty.

Export duties includes cesses on exports, but excludes profits of statutory marketing boards in Africa. These profits do not appear in these tables.

Import duties includes "customs duties" where these are not specifically divided between import and export duties.

Excise duties include sales tax, purchase tax, turnover tax, and minerals duties.

Motor licences includes vehicle licences, but not purchase taxes on vehicles, or petrol taxes.

Government department earnings includes trading profits and surpluses of government departments, revenue of state monopolies, revenue of government owned land and buildings, miscellaneous fees of government departments.

Miscellaneous fees includes stamp duties, licences except motor vehicle licences, fines, fees for specific services, miscellaneous revenue not elsewhere specified.

Interest : receipts on government investments.

3. Tanganyika.

Sources for central government : *Estimates of Revenue and Expenditure for the Year Ending June 30th, 1955, Dar es Salaam*. The figures are for the calendar year 1953 in the case of current expenditure and revenue, but for 1954-5 in the case of capital, since 1953 was not found in this source. The European, Indian and Other Non-Native (including Goan) Education Funds are included in full because they are financed entirely by the government ; contributions to Non-Native Education Authorities and loans to European Education Authorities are therefore excluded. No details are given for the 1953 Public Works Extraordinary expenditure or the 1953 Township Authorities expenditure, so they are both divided proportionately to their 1954-55 expenditures. Subventions and Contributions to the East Africa High Commission are included under the appropriate heads. Schemes financed from the Agriculture Development Reserve are included, and also the Capital Works Expenditure, which is financed from C.D. and W. grants, the Development Plan Reserve, Loan Funds, and the Lint and Seed Marketing Board Loan.

Source for local authorities : *Tanganyika Statistical Abstract, 1955*. The figures are for 1953. The revenues of the Native Treasuries are shown in total, but no details of sources are given other than their share of the Hut and Native Poll tax ; it is assumed that the other sources are distributed in the same proportions as the Dar es Salaam revenue.

The *Report of the Royal Commission on East Africa* estimates the money product of Tanganyika at £62 million in 1952. This is impossibly low, since the same source gives exports as £47 million and government expenditure as £16 million. We have estimated the gross national product (including subsistence) by rough methods at £121 million. A statistician in East Africa, who wishes to remain anonymous at present, arrived independently at £125 million, using more ample information. For 1953-4 we have assumed £121 million, equivalent to £15.0 per head.

4. Uganda.

Source for central government : *Estimates for the Uganda Protectorate for the Year Ending, June 30th, 1956*. The figures are for 1954-5 in the case of current expenditure and revenue, but for 1955-6 in the case of works financed through the capital budget, since the earlier figures were not available. Subventions and Contributions to the East Africa High Commission are included under the appropriate heads. The Price Assistance Funds are not included in the revenue.

Source for local authorities : *Annual Estimates for the Buganda Kingdom, Eastern Province, Northern Province and Western Province*. The figures are for 1953, the latest year available.

The gross national product is from *Background to the Budget*, Uganda Protectorate, April, 1955. Export taxes are added to the figure given in this source. We have used the figure for 1954, which is £109 million, equivalent to £20.1 per head.

5. India.

Source : *Report of the Taxation Enquiry Commission*, Vol. I. The figures are revised estimates for 1953-4. The source gives consolidated estimates as well as estimates for each level of government, but does not include capital expenditures by minor authorities. Community Development is included under Agriculture. Receipts in aid of superannuation are included in Miscellaneous Fees.

The same source estimates net national product for 1953-4 at 105,000 million rupees, equivalent to 282.5 rupees or £21.1 per head. We have used this net figure.

6. Nigeria.

Source : *The Economic Development of Nigeria*, a report by the International Bank. The figures are for 1952-3. The Public Works figure includes the whole establishment cost of the Public Works Department, some of which should be included under Roads, Water Supplies, etc. Expenditure on the public debt interest is excluded from the Administration figure but the latter still includes expenditure on pensions and gratuities which should be shown separately under social insurance. Revenue from Customs and Excise has been divided in accordance with information given in the 1953 *Annual Colonial Report for Nigeria*. Extra-budgetary receipts are included under interest, being interest receipts of the Revenue Equalisation Fund and other funds, and reimbursement receipts from Marketing Boards and similar institutions. Other non-Tax Receipts are divided between land tax, government department earnings and reimbursements in proportion to the 1953-54 expenditure on them by the Regional governments. "Other Local Receipts," which includes all receipts from public services, are divided equally between Government Department Earnings and Miscellaneous fees. The figures include expenditure from renewals funds held by the central and regional governments ; from the central government Highways Capital Account, the Cameroons Development Fund, the distributed profits of the Cameroons Development Corporation, the Northern Region Capital Development Account, the Loan Development Fund and expenditure by the central and regional governments reimbursed by Marketing Boards or Regional Production Development Boards. Also, Development and Welfare expenditures are divided between the federal and regional governments, according to the administering authority, despite the fact that payments originate in, or pass through, the federal government.

This source estimates gross national product in 1952-3 as £677.4 million, equivalent to £21.7 per head.

7. Ceylon.

Source for the central government : *Estimates of Revenue and Expenditure for the year ending September 30th, 1956*. Also, *Estimated Capital Outlays of the Ceylon Government, 1955-6*. The figures are for 1954-5. Food subsidies, manure subsidies and refunds of fuel tax on tractors are included in Agricultural Subsidies. Eradication of plant pests is included in capital expenditure. The capital expenditures of the railways and other public utilities are included.

Source for local authorities : *Statistical Abstract of Ceylon, 1955*. These figures are for 1953. Details are not given for Town Councils or Village Committees ; the totals given have been allocated in the same proportions as Urban Councils.

The *Statistical Abstract of Ceylon, 1955*, estimates gross national product for 1954 at 4,772 million rupees, equivalent to 569.2 rupees or £42.5 per head.

8. Gold Coast.

Source : A special analysis of the budgets of central and local authorities was made for us by the Gold Coast Statistical Department, to which we are most grateful. The data supplied have been slightly re-arranged. Figures are actuals for 1953-4.

In their *Report on the Financial and Physical Problems of Development in the Gold Coast, 1952*, Seers and Ross estimated the national income for 1950-51 at £152 million, including food sales of £30 million but excluding food consumed on farms. According to the *Economic Survey of the Gold Coast*, food produced in 1953 was worth £73 million, and prices were the same as 1951. This brings the Seers and Ross estimate up to £195 million for 1950-51, all-inclusive. Allowing for changes in output and prices, we have estimated gross national product in 1953-4 at £208 million, equivalent to £50.4 per head.

9. Jamaica.

Source for central government : *Annual Estimates for the year ending March 31st, 1956*, and *Development Estimates for 1954-5*. The figures used are for 1954-5.

Source for local authorities : *Annual Estimates for the parishes and for the Kingston and St. Andrew Corporation*. These figures are for 1953-4.

In *Social and Economic Studies*, Supplement to Vol. 4, No. 4, Alfred P. Thorne estimates gross domestic product at £105 m. in 1953. Income from overseas amounted to about £1 million. We have used a figure for gross national product of £106 million, equivalent to £71.3 per head.

10. British Guiana.

Source for central government : *Annual Estimates and Development Estimates for 1955*. The figures are for the year 1953. The land settlement schemes, processing factory, produce depot and transport services are included net. Expenditure under Public Works Miscellaneous, "roads, rivers, creeks and portages" is allocated to roads. Public Works Extraordinary is distributed proportionally to the 1955 expenditure, since only the total is given for 1953. Only the total for the Cost of Living Allowances for 1953 is given, so the 1954 proportions have been used.

Source for local authorities : *Annual Report of the Commissioner of Local Government for 1953* ; also *Statement of the Funds of the City of Georgetown for 1953*. The figures are for the year 1953. Only totals were available for New Amsterdam, so the distribution of revenue and expenditure was presumed to be proportionately the same as Georgetown. Total local expenditure in 1953 is given in the *Annual Colonial Report*, so the expenditures of Village and Country Districts were obtained by difference. Their distribution was assumed to be the same as in 1951, using the details given by Percival and D'Andrade in *The National Economic Accounts of British Guiana, 1948-51*. The revenues of the districts are given in the Commissioner's Annual Report.

The *Annual Colonial Report for British Guiana, 1954*, estimates net national product at factor cost at \$170 million in 1953, basing itself on earlier estimates by Percival and D'Andrade. We have added \$8 million for depreciation, making gross national product \$178 million, equivalent to \$387.4 or £80.7 per head.

11. Colombia.

Source : *The Basis of a Development Programme for Colombia*, a report by the International Bank for Reconstruction and Development, 1950 ; with several mimeographed appendices. The figures are for 1947. The classification used in this report is not always the same as ours, and we have not had the budgets to make our own classification. These figures are therefore not strictly comparable with the others.

This source estimates gross national product in 1947 at 3,367.5 million pesos. Colombia's position in the tables, however, is determined by her gross national product in 1953, estimated at 7,970 million pesos, equivalent to 658.3 pesos or £93.7 per head.

12. Italy.

Source : *Italian Economic Survey*, May-June, 1955, published by the Association of Italian Joint Stock Companies ; and *Ragioneria Generale Dello Stato, Bilancio di Previsione, 1953-4*. The figures for the central government are for 1953-4. "Grants to public bodies" and "deficits of autonomous concerns" are excluded because no details are given in these sources. The figures for capital expenditure are for assessments and not payments, because the latter include arrears of payments relating to the previous year. Expenditure on war losses is included under Housing. The Investment Fund for the South and investments for autonomous concerns are included.

The figures for the local authorities are for 1953, and relate to the Communes, Provinces and Regions. These sources do not give details for "economic and productive expenditure," so in the combined tables this item, amounting to 1.52 per cent. of G.N.P., has been split between Agriculture, Land Settlement, Roads and Transport.

The United Nations' *Statistics of National Income and Expenditure, 1955*, gives gross national product for 1953 as 10,177 billion lire, equivalent to 214,500 lire or £122.1 per head.

13. Trinidad.

Source for the central government : *Annual Estimates for Trinidad and Tobago for 1955*. The figures are for 1954.

Source for local authorities : *Annual Statistical Digest for 1953*, and *Annual Colonial Report for Trinidad, 1953*. The figures are for 1953. In the municipalities, "public services expenditure" is divided between health and roads in the same proportions as central government expenditure. In the County Councils the total revenue is divided between rates and miscellaneous fees in the same proportion as central and municipal revenues combined.

In *A Fiscal Survey of the Caribbean*, A. R. Prest estimates gross domestic product at market prices in 1953 at \$400 million, equivalent to \$590 or £122.9 per head. We have used these figures.

14. France.

Source : Ministère des Finances, *Statistiques et Etudes Financières*, No. 52 April, 1953, Supplement 74, February, 1955, No. 76, April, 1955 ; and *Le Budget de 1954*. The figures are for 1953. *Reconstruction et urbanisme* is included under Housing, *affaires économiques* under Commerce. *Subventions aux entreprises d'intérêt national* are excluded because no details are given. *France d'Outre-mer* is included in all the tables. Capital expenditure includes *réparations des dommages de guerre, reconstruction et équipement des services civils, investissements économiques et sociaux exécutés avec le concours de l'Etat*, which are financed from *fonds publics*.

The figures for local authorities exclude Hospital Boards. Expenditure on assistance is to a large extent health expenditure, so *dépenses d'assistance*, *assistance*, *prévoyance*, *famille*, and *securité*, *salubrité*, *santé* have been divided two to one between health and social insurance respectively. *Acquisitions*, *travaux neufs* et *grosses réparations* are included under public works. Local capital expenditure is taken out of the total expenditure to give current expenditure.

The United Nations *Statistics of National Income and Expenditure* gives gross national product for 1953 as 12,321 billion francs, equivalent to 287,500 francs or £292.4 per head.

15. United Kingdom.

Source : *National Income and Expenditure*, 1955. The figures are for 1954. School meals, milk and welfare foods and child care are included under Education. Town and country planning and parks are included under Administration.

The gross national product for 1954 was £15,718 million, equivalent to £309.6 per head.

16. New Zealand.

Source : *Official Year Book for 1955*. The figures are for 1953-4. Expenditure of Hospital Boards is included in central government expenditure. Transfers from the National Development Loans Account to the Electricity Supply Account, the Land Settlement Account, the State Coal Mines Account, the Workings Railways Account and the Post Office Account are included under Capital expenditure.

For local authorities the totals for 1953-4 are allocated in accordance with the proportions for 1951-2, given in detail in *New Zealand Local Authorities Handbook*, No. 28, 1951-2.

Gross national product for 1953-4 was £N.Z.776 million, equivalent to £N.Z. 380.8 or £379.3 per head.

17. Sweden.

Source : *National budget for År 1955*, and *Statistisk Årsbok for Sverige*, År 1955. The figures for the central government are for 1953-4. Capital expenditures are shown separately in detail. Some capital expenditures are, however, shown in the current budget, and though the total amount of these is available, their distribution is not. We have assumed that the distribution of the capital figures in the current budget is the same as the distribution of total capital expenditures. A similar adjustment has been made for the expenditure of the local authorities, which is known in total and in detail, but part of which is financed by transfers from the central government which are not shown separately. It follows that our tables for combined capital expenditure and for local revenues and expenditures are accurate, but the table for combined current expenditure, while accurate in total, is not quite accurate in detail.

Gross national product in 1954 was 41,750 million kroner, equivalent to 5,788 kroner or £398.6 per head.

18. United States of America.

Source for the federal government : *The Budget of the United States for 1955*. The figures are for the year 1952-3. Veterans' services and benefits are allocated to the appropriate categories. Stabilisation of farm prices and incomes is in Agricultural Subsidies. Insurance trusts, revenues and expenditures are included gross.

Source for states and local authorities : *Compendium of State Government Finances in 1953*, *Compendium of City Government Finances in 1953*, *Statistical Abstract of the United States*, 1955. The figures are for 1952-3. For capital expenditures of Townships only the totals were available, and these were divided proportionately to the current expenditures on roads and education. The capital expenditure of Special Districts is allocated to Housing.

Gross national product was \$332.2 billion in 1953, equivalent to \$2,081 or £740.6 per head.

The Growth of U.S. Investment in U.K. Manufacturing Industry 1856/1940¹

THE EARLIEST BEGINNINGS.

Though a handful of United States' firms had established sales agencies and banking houses in this country during the late 18th and early 19th century,² not until 1856 was there any direct American investment in British manufacturing industry. At that date, however, a vulcanised rubber factory was set up in Edinburgh with capital subscribed by five Americans who were partners in the U.S. firm of J. Ford and Company, New Brunswick.³ The partnership was later incorporated into a limited company—The North British Rubber Co., Ltd.—and the original investment increased, but in the second half of the 'sixties, partly owing to unfavourable European trading conditions, and partly to the desire of the parent company to enlarge its own manufacturing facilities, the entire U.S. shareholding was repatriated.

The belief that higher profits could be earned in the United Kingdom than by expanding in the United States, was the chief reason for this initial investment, though the actual choice of location was strongly influenced by the fact that, at that time, English patents were not protected in Scotland, and could thus be exploited there without the payment of royalties. The new plant was entirely American-designed, and early production was facilitated with the aid of specialised machinery and a nucleus of key workers especially shipped over from the parent plant.

Essentially, however, the first exclusively American innovation to be widely commercialised in this country by way

¹This article is a facet of a larger piece of research into U.S. investment in U.K. industry which has been partly financed out of Counterpart Funds made available by the U.S. Government under the Mutual Security Act, 1952.

²See e.g. Cleona Lewis *America's Stake in International Investment*. (1937). Chapter IX *et seq.*

³W. Woodruff, "The American Origin of a Scottish Industry," *Scottish Journal of Political Economy*, Feb., 1955.

of branch plant enterprise, was the sewing machine. Here, the Singer Company led the way with the establishment of its first U.K. manufacturing unit at Bridgeton, near Glasgow, in 1867. For some years previously, imports of sewing machines from America had been growing—especially since 1864, at which date the now world-renowned sales and servicing facilities of the Singer Company had been first introduced.¹ With the expansion of home production—in 1902 the U.K. subsidiary produced its 10 millionth sewing machine—these now gradually diminished: by 1899 they were worth only £92,894, and by the beginning of the First World War, this country had substantially replaced her former dependence on imported sewing machines for an export trade of nearly £2½ million.²

In the same year as Singer commenced production at Glasgow, R. Hoe & Company of New York, set up a wholly-owned British subsidiary in London to manufacture its newly designed revolving printing press. Replacing the much slower steam and hand methods of printing, the American machine, with its output of 20,000 impressions an hour, in effect brought about a revolution in newspaper printing³ thus enabling the U.K. firm to “flourish practically unworried by competition . . . supplying almost all the leading newspapers in Great Britain and Ireland with its machines.”

With the increased speeds in newspaper production now made possible, there arose the complementary need for new and faster methods of typesetting and line adjustment. In this field, too, American capital invested in a British originated company—the Linotype & Machinery Co., Ltd.—played a major role. During the 1880's, the Mergantheler Linotype Company of New York had commercialised the patents of the German, Ottmar Mergantheler, by which typesetting could be carried out both mechanically and a line at a time. Such machines were then produced in the United Kingdom by the Linotype Co., Ltd., under licence, but later, after that firm

¹Cleona Lewis, *op. cit.*, p. 182.

²*Statistical Abstract for the U.K.*, 1903. Cmd. 1727/XXX and 1914/16 Cmd. 8128/XXVI.

³For further details see M. Plant, *The English Book Trade* (1939) and R. Hoe, *A Short History of the Printing Press* (1902).

had merged its interests with those of the Machinery Trust Co., Ltd.—another U.K. concern—the American corporation gained complete financial control. By the early 1900's, the new subsidiary, was assembling American-designed machines from parts imported from the United States, and in spite of design and manufacturing problems, was supplying most of the national, and many of the provincial, newspaper printing houses by 1914.

1870/1914 THE FORMATIVE YEARS.

(a) *The Electrical Developments.*

The period between 1870 and 1914 saw a well-defined pattern of U.S. investments being developed in this country. The actual capital involved, and the number of American firms establishing branch subsidiaries, was not large, but the impact made on British industrial progress and efficiency was both widespread and of unquestionable significance. Indeed in certain branches of industry, U.S. capital and "know-how" combined to provide the vital impetus to growth at this time.

Such for example might well be said of the development of the electrical equipment industry before 1914. For the early history of the lighting, traction and communication sections was strongly influenced both by the establishment of American branch manufacturing units and by the conclusion of licensing agreements between U.K. and U.S. concerns. And on the basis of these three applications, the whole complex structure of the present-day electrical industry was built. Nowadays the Standard Telephones & Cables Co., Ltd., is the last of the major U.K. electrical manufacturing concerns in which there is still a substantial American shareholding. Yet, at one time or another, over the past seventy years, nearly all the modern electrical giants in this country have had direct or portfolio U.S. capital invested in them.

American investment in the lighting industry first showed itself with the formation of the Edison Swan Electric Co., Ltd., in 1883.¹ The purpose of this new company was to exploit the

¹Three years previously the Anglo-American Brush Electric Light Corporation, Ltd., had concluded a licensing arrangement with the American Brush Company to manufacture arc lamps and arc lamp apparatus under licence to the American Brush Company, but no foreign capital had been involved.

patents, and take over most of the business, of the Edison Electric Light Co., Ltd.—the British licensee of the American Edison Company—and the Swan Electric Light Co., Ltd.—a purely British concern. For some years prior to this merger, developments in incandescent lamp production had been proceeding more or less concurrently in the two countries—Edison having applied for a U.K. patent for his invention in 1879, and Swan in 1880.¹ The amalgamation was in fact a reflection of the two firms' desire to avoid possible patent litigation in the future. The Edison shareholding in the new company was 40%, but this quickly fell as the capital was redistributed amongst American individuals, and as subsequent issues were taken up in the United Kingdom. Yet, the merger meant in effect, that for a period of ten years, until the Edison patents expired in 1893, the new company had virtually a complete monopoly in the production of incandescent lamps in this country.

In 1896, a second major development occurred with the formation of the British Thomson-Houston Co., Ltd. (B.T.H.)² This company was granted exclusive rights to make and sell a wide range of equipment, including lamps, lamp machinery, railway electrification equipment, generating capacity and switchgear, under licence to the American Thomson-Houston Company. At first, only a nominal U.S. financial interest was envisaged, but in 1897, as a result of a patent agreement made with the General Electric Company, New York, (G.E.C.), the American shareholding increased considerably. In 1901, the G.E.C. acquired the American Thomson-Houston Company, (and also the Edison Electric Light Company (U.S.)), and changed its name to the International General Electric Company (I.G.E.C.). This transaction gave it a majority interest in the equity capital of B.T.H., and four years later U.S. ownership became complete.

During these latter years, a considerable managerial and technical re-organisation took place at the B.T.H. Rugby factory. Administrative and engineering personnel were

¹*The Pageant of the Lamp*, *op. cit.*, p. 28.

²*B.T.H. Reminiscences: Sixty Years of Progress* (1946). Compiled by H. A. Price-Hughes. p. 9 *et seq.*

brought over from the United States to take over all the senior executive posts and the latest American manufacturing techniques and equipment were installed. Yet the period of U.S. management was (purposely) short-lived and without question—as in the Edison-Swan merger—the most valuable benefit which the British company derived from its American associate during the years of partnership was the research, development and manufacturing “know-how” received, particularly in respect of turbines, batteries, lamp-making machinery railway electrification, telephones and dictagraphs. This enabled, for example, B.T.H. to supply a major part of electrical equipment for the Central London Railway (1900), the London Underground Railway (1905)¹ and more than 50 tramway systems throughout the country.

Further in this field, a wholly-owned subsidiary of the U.S. Westinghouse Electric Company was set up in this country in 1899—18 years after the first Westinghouse factory had been established at King’s Cross, London, for the manufacture of air-brakes. In fact, it was during the course of his work as a railway engineer that George Westinghouse first recognised the possibilities offered by electric traction, and particularly could he foresee the potentialities for a country such as Great Britain, with its compact and strongly localised industrial population. In 1899, a new company was formed to exploit this idea and five years later manufacturing started in a huge new factory at Trafford Park, Manchester. Like the King’s Cross plant, it was designed and constructed on U.S. lines, and under the supervision of American managers. Shades of the Fawley refinery project to come nearly 50 years later, were reflected in the report issued at the time which said “the construction of the works was a speed record for British workmen under American contractors . . . due to good wages, good supervision and the use of new mechanical devices.”² Most of the original machinery and fixtures were, in fact, imported from the United States, and to start with all senior posts, including works foremen, were held by American nationals. At the same time,

¹B.T.H. *Reminiscences*, *op. cit.*, p. 11.

²John Dummilow : 1899/1949, (*A History of Metropolitan-Vickers, Ltd.* (1949), p. 29.

40 British personnel were sent over to the parent company to study engineering and managerial methods, and it was these men who on their return gradually assumed executive control. Right up to 1917, however, when the U.K. subsidiary was purchased by Metropolitan-Vickers Co., Ltd., the Managing Director, Works Manager and Chief Electrical Engineer continued to be American.

Finally, American influence played an important role in the early development of the U.K. telecommunications industry. In March, 1876, Graham Bell patented his invention "which in essence covered all the principles of telephone transmission"¹ in the United States, and two years later, with a view to exploiting these patents, the first telephone company in Great Britain was registered under the title Telephone Co., Ltd. (Bell Patents). The following year saw the formation of the Edison Telephone Company of London, Ltd., to work the American patents of Thomas Edison's electro-chemical telephone. For ten months, the two concerns competed fiercely with each other, but in 1880, faced with the threat of litigation by the General Post Office, who was claiming under the Telegraph Act of 1868 the sole authority to acquire, maintain and work the electric telegraph—and this included the telephone—they merged their interests and became the United Telephone Co., Ltd. In December, 1880, a High Court ruling upheld this view, but because the Bell and Edison patents did not expire until 1891, a compromise was made. The G.P.O. licensed the United Telephone Company and its subsidiaries to operate in certain restricted areas, but reserved the right to purchase the exchanges for themselves at 1890 or 7-year periods thereafter.

As the years passed, however, and the Post Office's telegraph revenue fell off, its restrictions became more stringent. Undecided in policy, wavering between encouraging competition amongst private telephone companies on the one hand, and building up its own monopoly on the other, yet all the time trying to protect its other sources of income, it is inevitable that the G.P.O. must be held largely responsible for the slow, unsystematic and piecemeal telephonic development which followed during the next 30 years. In 1898, for example, a

¹J. H. Robertson, *The Story of the Telephone* (1947), p. 7.

Select Committee reported that the British telephone service, as it was then operated, was neither to the benefit of the country at large, nor even in the most limited portions of it where exchanges existed.¹

Eventually, an agreement was reached in 1904 between the main competing interests, by which, for a lump sum payment, the complete telephone system of the United Kingdom was to be transferred to the State : this finally became effective on 1st January, 1912.

It has been a unique feature of U.K. telephone development that from the beginning, those firms manufacturing telephone equipment, and those responsible for its installation and operation, have been divorced from each other. Even the early Bell and Edison companies were simply agents for selling instruments and telephonic systems, and all equipment, including that for the first telephone exchange installed in 1879, was of American origin. Right up to the First World War, in fact, a very large proportion of the telephone equipment used in this country was imported. The main U.K. producers at this time were (i) the Western Electric Co., Ltd. (an American subsidiary which had purchased the important Fowler Waring Cable Company of North Woolwich in 1897) ; (ii) the Peel-Conner Telephone Works (a subsidiary of the General Electric Co., Ltd. (U.K.) which was controlled by an American Managing Director and (iii) the Automatic Telephone Co., Ltd.,—a British firm—the subsequent history of which will be traced in a later section of this article.

(b) U.S. capital in the older industries.

Such were the main influences exerted by U.S. capital in the early development of the U.K. electrical equipment industry, which, possibly because of the character of the products themselves and their "newness" to the United Kingdom economy, attracted particular comment at this time. Notwithstanding, during the closing years of the 19th century, American capital also began to infiltrate into a number of well-established branches of British industry. Here, for the most part, the *raison d'être* was not so much to introduce a new product as

¹*Report of the Select Committee on Telephones, 1898.* XII, I.

such but a new technique or method of manufacturing, though, in selected instances, there was a deliberate attempt to gain control of the British and European markets.

Three case studies may serve to illustrate these points. First, in 1896, the Diamond Match Company of New York set up its own manufacturing unit at Liverpool, after failing to find a purchaser for the U.K. rights of its new continuous match-making machine. At that time, British match production was largely in the hands of Bryant & May, Ltd., who were still dipping and drying matches by hand, and who—so it was reported in 1902—had not improved their match-making machinery for 16 years.¹ The impact made by the Diamond Company on match production in this country was both immediate and marked and within five years the American subsidiary had built up a market equivalent to that previously held by Bryant & May—dividends of which had fallen during this time from 20% to 14%. Eventually, in 1901, an agreement was reached between the two firms; in exchange for the goodwill, property rights and assets of the Diamond Match Company (U.K.), Bryant & May surrendered 54.5% of its own capital and virtually its entire voting power. Various market-sharing arrangements were then concluded between the two firms, though the effectiveness of the partnership was short-lived, as the greater part of the U.S. shareholding was soon repatriated and new capital issues were entirely taken up in this country.

Secondly, at the turn of the century, the British tobacco industry was literally “invaded” by American capital. Restricted in its sales by a high tariff wall imposed on U.S. cigarettes, the American Tobacco Company acquired the young and prosperous British firm of Ogdens, Ltd., in September, 1901, and straight away launched an extensive publicity campaign to sell cheap cigarettes. The reaction of the British producers was prompt for within a month of the purchase of Ogden's, 13 of the leading tobacco companies had amalgamated and formed themselves into the Imperial Tobacco Company, with

¹F. A. McKenzie, *The American Invaders* (1902). See also *Report of a Sub-Committee to Enquire into the price of Matches*, 1920. Cmd. 924 and *Report on the supply and Export of Matches and the Supply of Match Making Machinery* (Monopolies Commission, 1953). M.C. 161.

an issued capital of £14½ million.¹ In a bid to capture the market, Ogden's cut their prices up to 45%, to which Imperial retaliated by trying to gain exclusive control of retail outlets. Eventually, a market-sharing agreement was reached in September, 1902; Ogden's became part of the Imperial Tobacco Group which was given the monopoly of the British and Irish markets, and the United States and its dependencies were to be supplied by the American Tobacco Company. A new concern, the British-American Tobacco Co., Ltd., was set up to handle the remainder of the export business and was allocated factories both in the United States and in the United Kingdom. There is little evidence to suggest that American methods of cigarette manufacturing had much effect in this country during these early years, but there is no doubt of the marked impact which was made on the structural set-up of the tobacco industry. As Clapham pointed out . . . "with their assured markets and immense power, the Imperial and the B.A.T. were successful . . . It was the nearest thing in Britain to a free monopoly."²

The third U.S. foothold gained in this period was in the boot and shoe industry. In America, the scarcity and high cost of labour had led that country to mechanise the production of boots and shoes in the early stages of her industrial growth. By contrast, in the U.K. the industry had grown up on a craft basis; in 1892, for instance, the large majority of boots and shoes were still being made by hand—and at home. Gradually however, between 1890 and 1914, U.S. manufacturing techniques were adopted and this transition from "old" to "new" was largely made possible by the availability of American-designed boot and shoe machinery in this country. This was manufactured by the British United Shoe Machinery Co., Ltd.—an off-shoot of the United Shoe Machinery Corporation of Boston, U.S.A.—formed in 1899 by amalgamation of the English businesses of two separate American companies, and by the outright purchase of the British concern, Pearson & Benyon, Ltd. As a result of this merger, which followed a

¹See e.g. H. W. MacCrosty: *The Trust Movement in British Industry*, p. 231.

²J. Clapham, *An Economic History of Great Britain*. Vol. IV, p. 269.

similar movement in the United States, "one company was now able to supply the shoe manufacturer with a complete installation of the most modern equipment for the whole of his business,"¹ and by 1902, it was reported that the superiority of the American machines compelled their use for efficient production².

(c) *The Field of Interest Widens.*

By 1900, it was estimated that over \$10 million had been invested by the 75 American subsidiaries, or jointly-owned Anglo-American enterprises, then operating in the United Kingdom.³ Of these firms only a dozen or fifteen were actually manufacturing, though many of the sales and distributive agencies being established by U.S. concerns at the time were deliberately preparatory to manufacturing in this country. No doubt, this latter movement was hastened by the extreme nationalistic feeling of the period, and U.S. firms in finding their exports reduced, attempted to circumvent this difficulty by investing in the United Kingdom and becoming as "Britishised" as quickly as possible. At the same time, Great Britain appeared to be the only major country where foreign capitalists were treated in the same way as residents.⁴ Lastly, in addition to those already mentioned, other well-known U.S. names to establish production units in the last years of the 19th century, included Kodak, Ltd.—cameras and sensitized films—(1890), American Arithmometer, Ltd., (later to become Burroughs Adding Machine Co. Ltd.)—office machinery—(1896), Babcox & Wilcox, Ltd.—boilers and heavy engineering products—(1881), and Maguire Tramways—tramcars—(1897).

The pace of American investment in British manufacturing industry quickened in the early years of the present century. In 1902, "*The Scotsman*" viewed the invasion of British industry by U.S. capital as the most remarkable commercial development of that year.⁵ Certainly, such investments as

¹From a letter to the writer from B.U.S.M., Nov., 1955.

²F. A. McKenzie, *op. cit.*

³R. H. Heindel, *The American Impact on Great Britain*, 1898/1914.

⁴W. F. Ford, "The Limits of the American Invasion." *Contemporary Review*, June, 1902.

⁵Quoted by R. H. Heindel, *op. cit.*

those already mentioned, attracted particular comment at the time, not only because the amount of capital involved was often considerable (*i.e.* in relationship to comparative British investments), but also because however hard an American financed firm might try to conform to national habits, it appeared that it was never able to "throw overboard" its identity completely.

Between 1901 and 1914, some 70 U.S. manufacturing subsidiaries, or jointly-owned Anglo-American concerns, established themselves in the United Kingdom; during these years both the character of, and the motives behind, the investment widened considerably. First, in the early years of the century, a flood of patent medicine companies invaded the British market. In retrospect, a Select Committee on Patent Medicines in 1914 argued that the tightening-up of American legislation concerning publicising the contents of certain medicines, was the main factor responsible for the majority of these firms coming to the United Kingdom.¹ Secondly, the Patents and Design Act, 1907, in providing for the revocation of patents not actually worked in the United Kingdom, is credited with having induced several American firms to produce in this country, *e.g.* in the cinematic film, safety razor, cash register, industries, etc.² Probably, however, the strength of this motive has been overemphasised. Thirdly, the first of a number of well-known food companies set up manufacturing units in the United Kingdom during this time—*e.g.* H. J. Heinz Co. Ltd. Here, the motive was obvious enough—to save transport costs and reduce breakage losses: moreover in many cases the product was perishable.³ Substantial savings in this direction also attracted farm machinery and motor vehicle firms: it was, for example, estimated some years ago that ten "knocked-down" cars occupied the cargo space of one completely assembled car.⁴ Fourthly, difference in British and American labour costs were already becoming evident, and these led to the establishment of a number of branch plants in the engineering

¹*Report of the Select Committee on Patent Medicines*, 1914. (H. C. 414).

²Cleona Lewis, *America's Stake in International Investments*. P. 311 *et. seq.*

³F. A. Southard, *American Industry in Europe* (1932), p. 115 *et seq.*

⁴F. A. Southard, *op. cit.*, p. 119.

and machinery industries; generally, however, such differences were a supplementary rather than a primary reason for investment, and sometimes, where U.S. companies made it a rule to carry their high wage policies to the U.K. with them, of negligible importance. Fifthly, the need to cater to a market's national peculiarities, coupled with the provision for adequate aftersales and servicing facilities, led numerous firms in the chemical, electrical equipment, foundation garment and musical instrument industries to establish branch plants in the U.K. at this time. In most cases, however, the inducement to invest was a combination of the above circumstances, and the general desire to expand business overseas.

In 1903, the first Ford car was sold in this country. As in the electrical equipment industry, restrictive legislation—e.g. until 1896 a man with a "red flag" had to walk in front of every vehicle—hampered development, though of greater importance was the fact that the structure of Britain's engineering industry was less suited to the production techniques demanded by the motor industry than was that of the U.S.¹ In 1908, the Ford Motor Co. (Eng.) Ltd.,—a new company—started to assemble imported components in an American-designed factory at Trafford Park. From the start, use was made of the semi-automatic principle of large-scale production, as adopted by the parent plant, and American executives employed. By 1913 Ford's was the largest U.K. producer, with an output of 6,000 vehicles per annum, out of a total U.K. production of 25,000 vehicles.²

The inflow of American capital was by no means restricted to manufacturing industry in these years. The development of selected branches of trade and commerce were also influenced by such investment. Foremost in this respect were (1) the formation of J. Pierpoint Morgan's Shipping Trust—the International Mercantile Marine—in 1902, with a capital of \$120 million.³ (2) the considerable influence exerted by the

¹G. C. Allen, *British Industries and their Organisation* (1950 rev. ed.), p. 158, *et. seq.*

²From an interview with the Ford Motor Co. Ltd.

³For further details and subsequent history see F. C. Bowen, *A Century of Atlantic Travel, 1830/1930* and C. R. V. Gibbs, *Passenger Liners of the Western Ocean*.

United States Beef Trust (consisting of Armour & Co., Swift Beef Co., Morris Beef Co. and Hammond Beef Co.) over meat distribution¹ and (3) the setting up of the first of the 900 Woolworth stores in 1910 and the general popularising of U.S. mail order, hire purchase and department store techniques.

By the outbreak of the First World War, then, American capital had permeated—and for the most part successfully—into a wide section of British industry and trade. At the same time, continuing its earlier pattern of selectivity, the investment was almost entirely restricted to the newer fields of production where the commercial supremacy of the United States was at that time most evident. Only to a very limited extent, for example, had any American influence infiltrated into the basic industries, which still then accounted for a great proportion of Britain's economic wealth. No reliable estimate exists of the amount or value of American direct investments in British industry in 1914, but as an order of magnitude, it would seem that about 70 U.S. subsidiaries and Anglo-American firms with a combined capital holding of \$75–100 million and an employment roll of 12–15,000 people, were operating manufacturing units at this time.

1919/1929—A PERIOD OF CONSOLIDATION AND STEADY EXPANSION.

(a) *New Motives for Investment.*

Between 1919 and 1929 the value and scope of U.S. direct investments in British industry steadily increased. Probably as many *new* businesses were set up in these years as at any comparable period before or since, and for the most part those manufacturing units established prior to 1914 greatly expanded their output as well. In addition to those reasons already cited, two new factors led to this increased flow of investment. First, as a result of the war, much of British industry was seeking to replace its capital and to re-equip itself with the latest production methods. At the same time, domestic savings were all too insufficient, whilst many overseas assets had been liquidated during the war; hence outside—and more particularly

¹See *Report of the Committee on Combinations in the Meat Trade*, 1909. Cmd. 4643.

American—capital was doubly welcome. On the other hand, the United States, which had now assumed the role of a major overseas lender, was increasing her capital exports each year, and though these were mainly directed to short-term portfolio investment, the offer made by some U.K. firms to, exchange part of their share capital for the latest research and manufacturing “know-how” proved to be very attractive.

Secondly, and more directly, many U.S. firms set up branch units in the United Kingdom during this period because of the growing import duties and/or quota restrictions imposed upon their products. Prior to 1914, the great majority of American goods had come into this country free of tariffs, but the McKenna Duties (1917), the Safeguarding of Industry Acts (1921 and 1927), and the Cinematograph Act (1927), each had the effect of driving a certain class of American imports out of the market. This meant that U.S. companies, if they wished to retain their United Kingdom trade, were freed to manufacture themselves in this country, or arrange for licencing agreements.

Most certainly this was an important factor influencing the growth of U.S. investment in the British motor-car industry at the time—the duties on vehicles and their components since 1917 being as much as 33% *ad valorem*. American imports, which in 1913 accounted for 80% of home production dropped to 40% by 1930. Though the Ford Motor Company was already a leading manufacturer at Manchester, several new motor-car companies and component suppliers set up branch units in the 1920's. Most noticeable amongst these was the purchase of Vauxhall, Ltd. by the General Motors Corporation of New York in 1927. Explaining earlier the reasons for seeking this investment, the President of the American concern said that in England he found “the general elements that provide a sound basis for investment in the motor industry, *viz.*: (1) high character values; (2) the amount and character of labour needed; (3) fundamental production facilities and (4) an expanding market.”¹ In the same year, the two largest United States' tyre companies—the Goodyear Rubber Company and Firestone Rubber Company—established manufacturing subsidiaries in the United Kingdom: both firms had been importing from their

¹Quoted in *Anglo-American News*, Sept., 1925.

parent company for some years previously. At the opening of the Firestone factory in London in 1928, Sir William Joynson-Hicks—the then Home Secretary—commented “that by imposing a 33½% tariff on tyres the Government had extended an invitation to Mr. Firestone to manufacture tyres in England rather than pay \$1,000 per day in import duties.”¹

By 1919, the Ford subsidiary had enlarged its activities to include the production of agricultural tractors—just two years after the first Fordson tractor had been imported from America in an effort to beat the German blockade by increasing home food production. A foundry and machine shop was established at Cork, Ireland, first assembling and servicing tractors imported from the parent company, but later relying to an increasing extent on U.K. suppliers.² Then in 1928 there came a major experiment when the whole of the American tractor plant was shipped complete from Rouge River through the Great Lakes across the Atlantic to Cork : and between this time and 1939, the entire world output of Fordson tractors was supplied from the United Kingdom. In the same year as the Cork experiment, by which time the Manchester factory was producing over 26,000 cars per year, the Ford Motor Co. Ltd., was incorporated as a public company with assets totalling \$35 million, 40% of which were British-owned. This concern acquired both the stock of the old Ford Motor Co. (Eng.) Ltd., and that of each Continental subsidiary operating at the time. A year later saw the start of a huge factory at Dagenham—with a capacity of 200,000 vehicles per annum—from which it was eventually planned to supply the entire European market with cars and tractors.³

(b) Further Electrical Developments.

During the 1920's, the ramifications of the electrical equipment industry vastly increased themselves. In 1921, B.T.H. and G.E.C. (U.K.) licensed each other to the use of their respective patents. Such patent-sharing, cross-licencing

¹Quoted in Southard, p. 117.

²But only until 1922 when production at Cork ended because of lack of demand. Factory production was then switched to cars and trucks, and not until 1927 was tractor production re-started.

³F. Southard, *op. cit.*, p. 77.

agreements and international pooling schemes were numerous in this era, though the actual amount of U.S. capital involved was small. In fact, direct participation by American companies, in this field, probably fell, as the Westinghouse Electric Co. Ltd., was purchased by a British company—the Metropolitan-Vickers Co. Ltd.—in 1917.

In 1928, however, an important structural re-organisation occurred when the Metropolitan-Vickers Company gained financial control both of the British Thompson-Houston Co. Ltd., and Edison Swan Electric Light Co. Ltd., at the same time surrendering a minority share of its own capital to the I.G.E.C. (New York). The new company was then re-incorporated as the Associated Electrical Industries, Ltd. (capital \$75 million) which in effect, gave it control over B.T.H., Metropolitan-Vickers and Ediswan.

In the telephone industry American interests widened with the purchase of a substantial interest in the British Automatic Telephone Manufacturing Co., by the Theodore Gary Group (U.S.) in 1919. As a result of this association, the Strowger system of automatic telephoning was introduced into the United Kingdom and accepted by the General Post Office as standard equipment. At the same time, because the Post Office refused to deal with a monopolist, yet wanted to avoid wasteful competition, patents had to be cross-licenced to the other main telephone apparatus suppliers—at that time Standard Telephones & Cables, Ltd., Siemens Brothers and G.E.C. In 1935, however, the Automatic Telephone Company became wholly British again, the Gary Group selling out its interests due to the unfavourable economic situation in America. The other American company, Standard Telephones & Cables Ltd.,¹ which changed hands in 1925 when the U.S. Western Electric Company was bought out by the International Telephone & Telegraph Co. Ltd., is still the largest telephone and cable manufacturer in Europe to-day.

Then finally, mention should be made of the interest shown by U.S. investors in electric supply distribution. Here, the Utilities Power & Light Corporation, Ltd., through the Greater

¹The successor of the Fowler-Waring Co. Ltd., see J. H. Robertson, *op. cit.*, p. 63.

London and Counties Trust Ltd., which was formed in 1925, played a leading part in fostering the development of electricity supply, particularly in rural and semi-rural areas in Southern England. In February, 1928, an offer was made to the shareholders of Edmundsons Electricity Corporation, Ltd., the result of which was that more than 95% of the ordinary capital of that company passed into the hands of the Greater London and Counties Trust Ltd. Further acquisitions were made by the Trust, but, ultimately, the control and management of all the companies was placed in the hands of Edmundsons by the transfer of all the shareholdings to that company. A policy of integration was then pursued and the great majority of the smaller undertakings were absorbed by the larger Power Companies within whose territory they were situated. In July, 1936, the American owners decided to withdraw from active participation in the electricity supply industry, and the Greater London & Counties Trust Ltd., sold its entire holding in Edmundsons. The Group then again became entirely British-owned, and in turn, the Greater London & Counties Trust Ltd., was placed in liquidation.¹

(c) *U.S. Capital in the Chemical and Gramophone Industries.*

During the 1920's, the flow of U.S. portfolio investment also began to increase rapidly, and was soon causing some apprehension. Eventually, discriminatory measures were taken. In September, 1928, at the annual shareholders' meeting of the G.E.C. (U.K.), it was agreed that foreigners be prohibited from voting. Yet, in January of the following year, heavy American buying which drove the company's £1 shares from 45s. to 87s. 6d. gravitated 60% of the stock to the United States.² In 1929, a proposal was put forward to offer a further issue of shares to U.K. subscribers only, but this was withdrawn owing to bitter protests.³ Such antagonism was by no means confined to the electrical industry; similar attempts towards "protective" action were taken by firms in the rubber, aircraft and cable industries, where American portfolio investment was

¹From a letter to the writer from the British Electricity Authority, Nov., 1955.

²F. Southard, *op. cit.*, p. 182.

³The entire U.S. shareholding was in fact repatriated in 1935.

also causing some anxiety. Certainly, this was another period in which people were encouraged to "buy British"—possibly because of the difficulty of an external trade position. Sir Charles Higham, speaking in October, 1930, asserted that this was the direct cause of many U.S. firms opening-up branch factories in this country.¹ Though disputed at the time, there is little doubt that the U.S. firms then operating in the United Kingdom, and those contemplating new factories, were less eager to publicize their origin or to advertise their production and management methods than previously—an attitude which persisted well into the following decade.

Notwithstanding, the infiltration of U.S. capital continued on a wide front. Between 70 and 80 American factories were set-up between 1919 and 1929 for the manufacture of boilers and radiators, marine and oil refinery equipment, safety razors and razor blades, surgical dressings, refrigerating apparatus, type composing machines, cosmetics, pharmaceutical items, films, food-canning machinery,² cinematograph equipment, pencils, office furniture, chewing gum, heavy chemicals and processed cheese. Three of these developments are worthy of special comment.

First, in the chemical industry, the Monsanto Chemical Company of New York purchased a 50% interest in the old-established Graesser Co. Ltd., in 1920, and aided by tariff protection (this time from German competition) expanded rapidly pioneering many new kinds of phenolic and plastic materials. In 1928, the remaining half interest was bought out, and since that date a number of other companies have been acquired. To-day, this firm is the largest all-purpose Anglo-American chemical concern in the United Kingdom. Then, in 1926, du Pont's purchased 48% of the issued share capital of Nobel Chemical Finishes, Ltd., which it held until the Imperial Chemical Industries acquired control ten years later. The main impact made by the U.S. firm in the intermediary period was to introduce and develop a variety of cellulose car lacquers.

¹*Anglo-American News*, Nov., 1930.

²For the developments in this field see *Anglo-American News*, January and June, 1930.

"To this extent," commented one executive "the du Pont holding was real and important."¹

Secondly, in 1922, the United States' drug concern—Liggett's International, Ltd.—purchased the whole of the ordinary share capital of Boots Pure Drug Co. Ltd. The founder of the British firm, Sir Jesse Boot, was by this time an invalid and anxious about the future of his company. At the same time, Liggett—a remarkable American who had built up a powerful chain of drug stores throughout the United States—was looking for further investment outlets. He made Sir Jesse an offer for his business, and a settlement was eventually agreed upon. In this way, the American company (and later the United Drug Company to whom shares were transferred in 1925) gained complete control of Boots, though in effect the American owners made no attempt to direct the business, which continued to grow on the lines adopted by its founder. In 1933, ownership of Boots returned to this country when a financial crisis in the affairs of the U.S. company forced the repatriation of its £1 million shareholding.²

Thirdly, the 1920's saw a marked expansion in the British gramophone industry. The origin of this industry in the United Kingdom dates back to 1898 when William Owen, an American lawyer, founded the Gramophone Company (later to become H.M.V.) in London. First assembling gramophones from parts made in the United States and importing recordings from Hanover in Germany, though later manufacturing at Hayes, the British company owed much of its early success to American methods of advertising and salesmanship.³ The Columbia Company of New York also established a British branch in the early 20th century, and with the Gramophone Company, supplied most of the U.K. output of gramophones and records up to 1914. During the war, the American gramophone industry developed markedly in relation to its U.K. counterpart, so much so, in fact, that in 1919 the R. C. Victor Company of New York purchased a 50% interest in the

¹From a letter to the writer from the Imperial Chemical Industries, Nov., 1955.

²F. A. Southard, "American Industry Abroad since 1929," *Journal of Political Economy*, August, 1933.

³R. Gelatt, *The Fabulous Phonograph*, p. 104, *et seq.*

Gramophone Company for \$9 million. This position was reversed in the early 20's when the U.S. industry, having apparently reached its zenith, lost ground with the growing competition of the radio. Eventually, the U.K. Columbia Company, under the directorship of Louis (later, Sir Louis) Sterling, purchased a 93% interest in its parent company, at the same time signing a licensing agreement with the Western Electric Company for its electrical recording process which it had earlier introduced into the United Kingdom. An opposite movement took place in 1926 when the British Brunswick Company established a U.K. subsidiary to manufacture gramophone records, but this venture proved unsuccessful, and was wound up three years later. Finally in 1931, the H.M.V. and Columbia Companies merged their interests to form Electric & Musical Industries, Ltd., but four years later the R.C.A. Victor Company disposed of the last of its holdings in this firm to avoid trouble under the Sherman Anti-Trust Acts.

In 1929, the first Official Census of American Direct Investments in Foreign Countries was undertaken by the U.S. Department of Commerce.¹ Then it was estimated that there were 169 manufacturing units operating in the United Kingdom in which there was an American equity shareholding of 25% or more. Their combined investment was put at \$268 million, or 55% of all U.S. capital holdings in this country. Sales agencies, trading ventures, banking houses, mining and agricultural enterprises made up the balance. No detailed breakdown concerning the nature of the manufacturing assets held was given for the United Kingdom separately, save that American interests at the time were most noticeable in the electrical good, machinery, metal product, musical instrument, automotive vehicle, chemical and foodstuff industries. For Europe as a whole, of the total investment in manufacturing industries, electrical equipment accounted for 25%, motor vehicles 14%, machinery 12%, metal products 8% and chemicals 9%. As to the *form* of the United States' capital holdings, the direct subsidiary proved to be the most popular,

¹*American Direct Investments in Foreign Countries.* Trade Information Division, No. 731 (1930).

though in Europe "there were enough large and well-established organisations to attract U.S. capital."¹ This was mainly put down to the large number of manufacturers which sold interests to U.S. companies to finance the necessary modernisation and expansion of their plants after the First World War.

1930/1939—TARIFF POLICY INDUCES MORE U.S.
FIRMS TO BRITAIN.

In 1934, in response to a Senate Resolution, the Department of Commerce published a further and more detailed report on American factories abroad.² This survey covered the period up to 31st December, 1932, and the definitions and terms used broadly corresponds to their counterparts in the 1929 document. It showed that in the United Kingdom, some 197 manufacturing units employing a combined labour force of 66,363, were operating in 1932, and that the total U.S. investment stake involved was \$165 million. Of the 150 companies which gave their original date of establishment, 12 (with a capital of \$25 million) had commenced production before 1900 (including one firm in 1860 and another in 1862), 33 (with a capital of \$38 million) between 1900 and 1919, and 94 (with a capital of \$80 million) between 1920 and 1932. Because only some of the companies gave details about the nature of their activities, it is not possible to assess accurately their distribution within manufacturing industry. Undoubtedly, however—as in 1929—the motor vehicle, chemical, electrical appliance and machinery industries, continued to account for the greater part of the investment, and within these groups it would seem that the major share of the market was supplied by a few comparatively large firms. On the other hand, between the two surveys, the range of products manufactured had increased to include pumps and valves, paints, milk and egg products, buttons, optical goods, soap products, toys, refined petroleum, silverware and domestic electrical products. It must, of course, be remembered that this second survey was carried out at a time of world economic depression, and there is no doubt that the

¹Trade Information Division, No. 731, *op. cit.*

²*American Branch Factories Abroad*. Senate Document 120. 73rd Cong. 2nd Sess. (1934).

value figures quoted underestimate, quite considerably, the true worth of the investments.

The abandonment by the United Kingdom of the Gold Standard in 1931, and the substitution of a "managed" currency and exchange control of its place, the Ottawa Agreements and the Imperial Preference Tariff of 1932, the growth of Government intervention and rationalisation in industry, and a gradual recovery of trade and commerce, heralded in a new economic milieu which had a natural effect on the flow of investment capital—especially American capital into the country. On the other hand, the world depression and its crippling effect on the American economy, had its own severe repercussions on both the "will" and the "power" of that country to invest abroad. Overseas lending first contracted in 1928 when domestic speculation became particularly attractive. After the Wall Street crash of the following year, it revived again, but was soon checked by political developments in Europe. Imports of the debtor countries contracted, and international trade and investment fell to a shadow of their former selves.

In 1929, \$7.4 billion was made available to the world by U.S. imports on current account and capital exports; by 1932, the outflow had fallen by 67% or \$2.4 million. Defaults by debtor countries became more frequent as prices slumped and overseas holdings were fast repatriated, in spite of currency depreciations, to help parent concerns weather their own economic difficulties. From the United Kingdom's viewpoint, the main effects of these years was shown in the next Official Census of U.S. Overseas Assets held in 1936.¹ Between 1929 (the date of the previous Census) and that time, though the *number* of U.S. capital holdings in British manufacturing industry rose substantially from 169 to 224, the *value* of such holdings increased only very slightly from \$268 million to \$271 million; the average investment had thus fallen from \$1.6 million to \$1.2 million.

In effect then, this meant that whilst there had been several large withdrawals of capital, counterbalancing factors, *e.g.* the

¹American Direct Investments in Foreign Countries, 1936. U.S. Dept. of Commerce Economic Series, No. 1 (1938).

Imperial Preference Tariff of 1932, the growing investment outlets in certain sections of British industry and the increasing competition of U.K. manufacturers to U.S. imports,¹ had by inducing many new investments, stemmed any absolute decline in the value of capital holdings. In all, between 65 and 75 U.S. subsidiaries and Anglo-American concerns set up manufacturing units in this country between 1930 and 1939. Over half of this number located their factories along the Great West and North Circular Roads, and on the Slough Trading Estate. There were no really revolutionary developments of the pre-1914 kind, yet, notwithstanding, the permeation of American manufacturing and managerial methods into U.K. industry continued. Though some U.S. companies did buy out or invest in existing British firms in these years, for the most part they preferred to set up their own branch manufacturing units. Important American firms investing in Britain for the first time during these years included the Hoover Company—domestic electrical appliances—(1930). Procter & Gamble—soap products—(1930). Cincinnati Milling Machines Co.—machine tools—(1931). Eric Resistor Corporation—radio components—(1931). Standard Brands, Inc.—food products—(1932). Remington Rand Co.—office equipment—(1937). Armstrong Cork Co.—cork manufacturers—(1937). International Harvester Co.—agricultural machinery—(1938).

Taking matters as a whole, the inter-war years were not an attractive period for British industrial development, with the United Kingdom's share in world manufacturing exports falling from 27% in the period 1911/13 to 22% in 1938.² The costs of some of the indecisions and mistakes of the last quarter of the 19th century were now beginning to show themselves. On the other hand, the period could hardly be called one of stagnation, as several new industries were evolved (*e.g.*, industrial instruments, electrical appliances, laundry machinery, synthetic fibres) and others rejuvenated (machine tools, chemicals).³

¹For further details see G. W. Parker, "American Branch Plants meet Foreign Competition." *Anglo-American News*, Jan. and Feb., 1933.

²W. A. Lewis, *Economic Survey*, p. 75 and M. F. G. Scott, "The Problem of Living within our Foreign Earnings." *Three Banks Review*, June, 1955, p. 14.

³G. C. Allen, *op. cit.*, p. 29, *et. seq.*

Yet, once again with her own industries better established, the United States tended to dominate in many of these fields, and in due course new ideas and techniques were introduced into the United Kingdom, either by subsidiary manufacturing units or licensing arrangements. For instance, industrial instrument development was noticeably advanced by the Bristol Instruments Company of New York which set up a subsidiary manufacturing unit in this country in 1932, and two Anglo-American concerns Foxborough-Yoxall Co. Ltd. (50% U.S.-owned), and Short & Mason Co. Ltd. (50% U.S.-owned) formed shortly afterwards. Much the same could be said of the British Laundry Machine Co. Ltd. and its impact on the development of the U.K. laundry industry¹ and of Frigidaire Ltd. and York Shipley Ltd. in the field of commercial refrigeration.

Within earlier established subsidiaries, the 1930's saw a steady expansion, though in some cases the proportion of the American shareholding was reduced, as public companies were incorporated, and the number of British directors increased. Gradually, too, a number of the earlier originated U.S. firms were becoming "Britishised" in their management. Perhaps the most rapid strides during this period occurred in the motor vehicles industry. The total number of cars produced by the British manufacturers increased from 170,000 in 1930 to 342,000 in 1938. During this time, the share of the Ford and Vauxhall Companies doubled—the former expanding its annual vehicle output from 22,000 to 77,000. In 1932, the Ford Company produced its first 8 h.p. model, which was specially designed for the United Kingdom market. More U.S. subsidiaries to supply components to these two concerns were also established.

In all then, the field of U.S. investment in the United Kingdom was much widened during this era. To counter-balance this trend, however, there were also cases of American-originated firms losing their identity and becoming either in fact or in practice, British companies.

¹For further details see *Anglo-American News*, Nov., 1935.

By 1940, total U.S. investments in the United Kingdom had risen to \$350 million and manufacturing investments to \$275 million.¹ At that date, the latter accounted for 13.6%—and next to Venezuela the largest share of all U.S. direct manufacturing interests overseas. Some 233 U.S. subsidiaries and Anglo-American concerns were then operating manufacturing units in this country, the direction of their interests being substantially the same as that which existed in 1936.

Since the end of the Second World War, changing economic circumstances have markedly affected the flow of U.S. investment to Britain. From many aspects it might be argued that no period has brought about such a combination of circumstances so conducive to the expansion of American business interests as that between 1939 and 1950. These developments are, however, outside the scope of this article and have in fact been dealt with elsewhere.²

JOHN H. DUNNING,

Southampton.

¹*American Direct Investments in Foreign Countries*, 1940. U.S. Dept. of Commerce. (1942).

²See e.g. the writer's "U.S. Manufacturing Subsidiaries and Britain's Trade Balance," *District Bank Review*, Sept., 1955. "Anglo-American Research Co-operation and Industrial Progress," *District Bank Review*, June, 1956, and *American Participation in British Industry*, to be published shortly by the American Chamber of Commerce, London.

Notes on the Theory of Replacement

Replacement may be defined as the acquisition of a new asset to fulfil a particular function, together with the simultaneous scrapping or transference to another use of an old asset which has hitherto fulfilled more or less the same function. The interest of the theory of replacement as a separate branch of the theory of investment derives from the fact that these two aspects of the act of replacement must be considered together ; that owing to some limitation of the market or of the capital of the firm it is not possible to operate the old asset and the new asset side by side.

To assess the profitability of acquiring the new asset, the profits expected from operating it must be compared not only with its initial capital cost but also with the profits which would have been earned if the old asset had been retained. This comparison is sometimes expressed by the requirement that the present value of the new asset's expected revenues should exceed the present value of its costs by more than the fall in the value of the old asset due to its displacement from its current use. Such a requirement, however, amounts to a special assumption, namely that the firm makes a choice in the current period between the old and the new asset, and plans to use whichever of them it chooses until the end of its economic life, without further replacement.¹ There is no reason to suppose that the firm will generally thus limit its plans to the lifetime of a single asset ; it may plan to continue production into the distant

¹The requirement may also be incorrectly applied. Some formulae suggested as criteria for replacement decisions (see, for example, J. H. Burnham and D. H. Bramley *Engineering Economics* Sixth Edition, London, Pitman, 1949-50, Part II, pp. 145-7) require that the *increase* in net yearly revenue made possible by the acquisition of a new asset should be sufficient to pay for both the capital cost of the asset and the fall in the book value of the asset which it displaces. Even if the book value of the old asset represents its " true " value, this procedure involves double counting : the power of the old asset to earn further revenue is allowed for twice, first by taking directly into account the fall in its value when it is displaced, and secondly by subtracting the revenue which the old asset could earn from that which the new asset is expected to earn and taking only the *difference* into account.

future. If so, it will regard a new asset acquired in the current period as only the first of a chain of replacements ; and similarly it will regard the old asset, if it decides to retain it for the time being, as the first in a different chain. The present values of the costs and revenues associated with these two alternative *chains* must be compared, not merely the present values of the costs and revenues associated with the old and the new assets, when deciding whether replacement is due.

This raises two difficulties. In the first place, future gross revenues from a chain of assets will depend upon demand conditions, which cannot normally be forecast far into the future. The first part of this paper will be devoted to a critical discussion of the attempt to reduce this difficulty by treating the replacement problem as one of cost minimization. In the second place, future costs will depend partly upon the course of technical progress ; the second part of this paper will discuss how far allowance can be made for this. Finally, the third part will examine some of the problems of discounting future money receipts and payments in an appropriate way.

I. THE COST MINIMIZATION APPROACH.

It may be possible, from engineering data and with some assumptions as to the future prices of factors, to make a good estimate of the future costs associated with different assets. There is an obvious attraction, therefore, in an approach which compares different assets on the basis of their costs alone. The use of this approach implies, however, that the firm's gross revenue, throughout the whole period for which it contemplates operations, is unaffected by the replacement policy adopted. This can only be so under certain restrictive assumptions.

It is convenient to discuss the possible effects of replacement on gross revenue under two headings : effects on demand conditions and effects on the firm's response to these conditions. Demand conditions refer to the terms on which, period by period, the output of the asset can be sold ; the firm responds to these conditions in accordance with some price or output policy. These two possible sources of changes in gross revenue

when an old asset is replaced by a new one will be discussed in turn.

(a) *Demand conditions.*

Since replacement has not been defined in such a way as to exclude the possibility of changes in the product, there are two cases to be considered here : where the product of the new asset is, and where it is not, the same as the product of the old asset.

(i) In the first of these cases, demand conditions will not normally be affected by the mere fact that the product is being produced with a new asset instead of an old one. There are, however, two exceptional possibilities. The first is that the price which buyers of the product will pay is dependent upon the firm's costs, as under cost-plus contracts. A reduction in costs in this situation lowers the gross revenue in the first place by lowering the price at which the product can be sold, and may increase it subsequently by enabling the firm to tender successfully for larger contracts in the future. The second possibility is that the replacement policies of the firm's rivals may be affected by the firm's replacement decisions. A decision to acquire a new asset which is expected to reduce costs may then react upon demand conditions by influencing other firms to acquire the new type of asset also and subsequently to reduce the prices at which they sell their products. "Technique leadership" of this type is, however, probably not very common.

(ii) Demand conditions must be expected to change when the replacement of the old by the new asset is associated with a change in product. But the suggestion has been made, for example, by Terborgh¹, that this need not invalidate the cost minimization approach : that where the new asset produces a better product than the old at the same cost as the old it should be treated as if it produced the same product at lower cost. Thus any increase in selling price with the new asset's product should be represented as an equivalent reduction in direct costs, and gross revenue may still be taken as a constant. This suggestion requires further examination.

¹G. Terborgh, *Dynamic Equipment Policy*, Machinery & Allied Products Institute, 1949.

Let the demand conditions for the product of the old asset in period t be represented by :

$$D_t = f_t(p_t), \text{ or } p_t = \Phi_t(D_t)$$

Let the corresponding relationships for the product of the new asset be represented by :

$$D'_t = f'_t(p'_t), \text{ or } p'_t = \Phi'_t(D'_t)$$

Then the difference in revenue in period t as a result of selling an amount x of the new product rather than the same amount of the old is given by :

$$x [\Phi'_t(x) - \Phi_t(x)]$$

which may be written as $x \cdot g_t(x)$.

It is suggested that this quantity should be subtracted from the costs of producing an amount x with the new asset in period t , so that gross revenue may be considered as constant.

Since, however, the purpose of the cost minimization approach is to dispense with the need to make an accurate forecast of demand conditions at different times in the future, this device is only helpful if the function $g_t(x)$ does not have to be calculated separately for every period, *i.e.*, if it can be replaced by a function $g(x)$ independent of the time period referred to. This means that the relationship between the demand conditions for the new product and those for the old must be :

$$f'_t(p_t + g(x)) = f_t(p_t),$$

where x is the amount sold when the price of the old product is p_t . There is no reason for supposing that it will necessarily be possible to express the relationship in this way.

It should perhaps be stressed that this argument relates only to demand and cost *conditions*, to the *positions* of the demand and cost curves. The firm's response to changes in the relative positions of these curves is discussed in the next section.

(b) *Response to Demand Conditions.*

Demand conditions may remain unchanged when an old asset is replaced by a new asset ; or where the new asset produces a new product, it may be possible to represent them as unchanged, as shown in the previous section. But replacement is not normally undertaken unless the direct costs of the

new asset are less than those of the old ; at first sight it therefore seems probable that even when demand conditions remain unchanged, the firm will respond to them by producing a greater output after replacement than before it. The cost minimization approach cannot be used if this occurs.

We may distinguish two cases : first where the capacity of an asset does not alter over time, and where the capacity of the new asset and that of the old asset is the same ; and second, where capacity of the new asset is not the same as that of the old.

(i) The assumption that the assets in a replacement chain are worked to a full and unchanging capacity often seems to lie behind the cost minimization approach. In this case there is clearly a fixed output irrespective of the asset which is producing it. It implies, however, that the price at which the product can be sold exceeds the direct costs of production plus user cost of both the old and the new asset, for all future periods in which the comparison between the two is relevant.

If full capacity working is not assumed, the cost minimization approach can only be used if output is unaffected by changes in the firm's costs. This may happen in one of several ways ; the demand for the product may be determined by factors outside the influence of the firm ; the share of the market enjoyed by the firm may be fixed, either directly by an output fixing agreement or indirectly by some form of agreed control over means of increasing demand, such as control over price and advertising policy ; or the product of the asset may be some good or service used within the firm itself, the output of which is dependent upon the other activities of the firm.

(ii) A difference between the capacity of the old asset and that of the new may be due either to the fact that the new asset is of a different type or to the fact that the capacity of the old asset has declined over its life. Technical progress often results in the introduction of new types of asset, which reduce costs per unit only if they are operated at a higher rate of output than the old assets. A decision to replace the old asset with the new implies in such a case a decision to change the rate of output, and the two assets cannot therefore be compared on the basis of their costs alone.

When the only cause of the difference in capacity between the old and the new assets is the tendency for the capacity of an asset to decline as it grows older, the choice of approach to the problem of replacement will depend upon the asset structure of the firm. The firm may operate a single asset. In this case, one of the factors which must be taken into account when making a replacement decision is the possibility that a new asset would be able to earn profits on that part of its output which the old asset, because of the decline in its capacity, can no longer produce. If so, the cost minimization approach is not legitimate.

This conclusion is modified when the firm operates a number of assets of the same type, of an even age distribution. In this case individual assets grow old and suffer a loss of capacity, but continual replacement keeps the average age and the total capacity of the stock of assets constant. The fall in the capacity of the individual asset is irrelevant to the question of its replacement except in so far as it is associated with a rise in costs per unit output.¹

The foregoing arguments have shown that there are many factors which could make either the demand conditions facing the firm or its response to these conditions liable to be affected by replacement decisions. There is, however, one final obstacle to the use of the cost minimization approach even when none of these factors is operative. If the firm plans to continue production, not indefinitely or for a fixed number of years but for a period dependent upon the lifetime of its assets, a replacement decision governs not only the type of asset used by the firm but also the length of time over which the firm will continue production. Gross revenue cannot then be left out of the calculations. The higher the level of gross revenue, the more profitable will be replacement decisions under which production will be carried on for a long period relatively to replacement decisions under which production will be carried

¹See Mathematical Appendix, Part I.

When the firm is not already operating a number of assets of the same type and of even age distribution but plans to build up such a stock of assets, the date of replacement cannot be found by a comparison of costs alone. This problem has been discussed by F. and V. Lutz, *The Theory of Investment of the Firm*, Princeton, 1951, pp. 108-9. It will not concern us here.

on for a short period ; the cost minimization approach cannot be used.

The main conclusions of this Section may now be summarized. The cost minimization approach has the apparent virtue of making it unnecessary to make detailed forecasts of future demand conditions, but is only legitimate when certain conditions are satisfied. The firm's rivals must not react to its replacement policy in such a way as to affect the demand conditions facing the firm ; in so far as replacement affects the demand conditions by altering the product, a simple relation must exist between the demand conditions for the old product and those for the new if it is to be useful to represent the change as a change in the costs of the new asset. Output must be unaffected by changes in the firm's costs, and in general the capacity of new assets should be the same as that of old, though this requirement may be relaxed in the case of firms with a stock of assets of uniform age distribution. Finally, the firm's horizon must not be dependent upon the life of any particular asset.

II. THE TREATMENT OF OBSOLESCENCE.

This Section will be devoted to a discussion of the effects of anticipated obsolescence upon replacement policy. A constant level of all factor prices will be assumed, and in order to simplify the discussion the cost minimization approach to the problem will be used. This raises a difficulty, since obsolescence may be due not to technical progress in productive methods (which affects costs) but to the development of new products (which affects revenue). In what follows, however, it will be assumed that increases in revenue due to the introduction of new products may be represented as corresponding falls in the costs of producing these products, gross revenue remaining unchanged ; no further explicit reference will be made to product obsolescence as distinct from obsolescence due to cost reductions.

It will be convenient to begin by discussing the problem of replacement policy when there is no obsolescence, with particular reference to the validity of the familiar result that replacement should take place when the direct costs of the old

asset are greater than the average costs of the new. There are three cases to be considered here.

(i) The simplest case is where the firm plans to operate an infinite chain of assets and wishes to minimize the present value of the costs of doing so. The average costs of a single asset may be defined as that level of costs which, incurred at a constant rate throughout the life of the asset, would have the same present value as the actual costs incurred in connection with the asset; normally there will be some "optimum" lifetime of the asset which will make these average costs a minimum. Since there is no obsolescence all the assets in the chain will be of the same type and will have the same minimum average cost; it is fairly clear that the minimum present value of the costs associated with an infinite chain of replacements is equal to the present value of a stream of costs at the level of the minimum average costs of a single asset from now to infinity. The choice then, in deciding whether replacement should be undertaken now rather than in the next period, is between incurring this stream of average costs from now to infinity on the one hand, and incurring the direct costs of the old asset for another period plus the stream of average costs from next period to infinity on the other. The only difference between these two is the difference between the direct costs of the old asset and the average costs of the new in the next period, and clearly replacement is unprofitable unless this difference is positive. Immediate replacement is the most profitable course if there is no period for which replacement can be delayed such that the direct costs of the old asset over that period are less than the average costs of the new asset. This is the familiar result, but it is worth stressing that it depends on the assumption that the firm plans to continue production to the infinite future.¹

¹B. Caplan, "The Premature Abandonment of Machinery," *Review of Economic Studies*, Vol. VII., pp. 113-122, suggests that the result only holds if the life of the new asset is infinite. This is not necessary; only the assumption of an infinite chain of replacements is required. Caplan's own discussion seems to be in terms of case (iii), where the firm's horizon is affected by replacement policy. In fact it seems to involve the assumption that the firm plans to produce up to the end of the lifetime of the asset which replaces the asset currently in service, and that this horizon date will be a fixed number, β , of years after the date of replacement.

(ii) Where the firm plans to cease operations at some fixed date the above method of reducing the comparison to one of costs in the next period breaks down, since the average costs of the replacing asset in subsequent periods will be affected by the choice of replacement date. Let us assume that the fixed date is not too far in the future, so that when the firm has replaced the existing asset no further replacements will be contemplated. The average costs of the replacing asset will depend on its lifetime, which will be shortened when replacement is postponed. The effects of this shortening cannot be stated with certainty, but it seems likely that the shortening will reduce average costs if the time between now and the fixed date is greater than the "optimum" lifetime of the asset, and will increase them if the time is less than this. This would imply that the time of replacement indicated by the "direct costs of old greater than average costs of new" formula should be delayed or advanced according as to whether the lifetime over which the new asset would have to be used is greater than or less than that which would make its average costs a minimum. If the assumption that the date at which the firm plans to cease operations is sufficiently near to preclude more than one replacement is dropped, it may be necessary to consider the effects of postponement or replacement upon the average costs of chains of two or more assets; but the general conclusion, that the profitability of replacement cannot be judged by a direct comparison between the direct costs of the old asset and the average costs of the new remains valid.¹

(iii) The third case is where the period for which the firm proposes to continue operations is not infinite or a fixed period of time, but depends on the date of replacement. In this case, as already argued, the cost minimization approach is not appropriate, and no formula based on costs alone can be valid.

¹It would of course, be possible to re-define the term "the average costs of the new asset" in such a way as to allow for the difficulties described in this paragraph and render the conventional criterion valid. But this definitional approach makes the problem appear simpler than it really is.

If the assumption that there is no obsolescence is abandoned it becomes impossible to base replacement policy upon a comparison of the costs of the old asset and of the new asset alone, even in the most favourable first case, where the firm plans an infinite chain of replacements. This is because the costs of future assets are no longer the same as those of current assets ; with the consequence that future costs will depend upon the time at which replacement is made, and a policy of minimizing the costs of the chain of replacements as a whole will therefore not normally be equivalent to a policy of minimizing the average costs of a single asset. Replacement policy must take into account the characteristics of assets which will be available in the future, which will be different from the assets currently available. Thus if a new asset is acquired today it will be the first in a chain of assets, with the successive dates of replacement O, T_1, T_2, \dots ; the costs of this chain will be the average costs of the first asset from O to T_1 , plus the average costs of the second asset from T_1 to T_2 , and so on. If replacement is delayed by a period, the new asset acquired will be the first in a different chain, with the successive dates of replacement $1, U_1, U_2, \dots$; since the assets are different from those in the first chain the average costs will also be different. The profitability of replacement in the current period can only be judged by comparing the present value of the costs of one chain against the present value of the costs of the other.

Provided that the characteristics of the new types of assets which are to be available in the future are known, it may be possible to judge whether replacement would be profitable by an extension of the techniques used when no obsolescence is present. Thus if a radical innovation, which will render the existing type of asset unprofitable to operate, is expected at some date in the future, this date may be regarded as the date at which the firm plans to cease operations with the existing type of asset, and the analysis of paragraph (ii) above will apply. On the other hand, if the innovation is not sufficiently radical to make the existing type of asset unprofitable to operate, but if no subsequent obsolescence is expected, the argument of paragraph (i) may be adapted to cover this case. The comparison to be made is between a

policy of replacement in the current period or replacement at a later date. There will be a date after which both policies will involve the use of the asset of the new type available after the innovation. Since no further obsolescence is expected after the innovation, the costs involved under both policies from this date to infinity are the same, being the minimum average costs of the new type of asset. It is therefore only necessary to compare the costs of the two policies up to this date.¹

More typically, however, the nature of the assets which will be available in the future is not known in any detail, nor can it be assumed that after a certain time no further progress will take place in the development of still more efficient assets. The firm may expect future assets to be better than present assets without being able to specify the ways in which they will be better. It is necessary to find some way of expressing this general expectation.

One asset might be defined as technically better than another if its average costs, calculated over the life of the asset which makes them a minimum, were lower than those of the other, calculated on a similar basis. If no further technical progress were expected and if an infinite chain of replacements were planned, it would always be profitable to plan to produce with the technically better asset in preference to the technically worse. It does not follow, however, that any asset will suffer obsolescence when a technically better asset becomes available ; for the expectation of further improvements may so shorten the economic lifetime of the technically better asset that its average costs become greater than those of the first asset. It is not theoretically satisfactory, therefore, to represent the firm's expectations of obsolescence as expectations of the development of new assets with successively lower minimum average costs.

If, however, average costs are regarded as affected by three factors—the capital cost of the asset, the direct cost of output

¹The firm has the choice of replacing its old asset immediately, of replacing it somewhat later, or of postponing replacement until after the innovation has taken place. The circumstances under which it will pay the firm to follow the third course and to "skip" the model of asset which could be currently acquired have been analysed by F. and V. Lutz, *op. cit.*, pp. 109-112.

with it when it is new, and the function showing the additional costs of output with it as it grows older and less efficient—a reduction in any one of these, the others remaining the same, must make the average costs of the new asset lower than those of the old asset whatever the lifetime over which the two are compared: it must cause the old asset to suffer obsolescence. One way of representing obsolescence would then be to assume that the assets which will be available in the future will be equivalent to the assets which are available at the present time in every way except that one of these components of average cost will be smaller the further ahead we look. The rate at which this component is expected to decline can then serve as an index of the rate of expected obsolescence.

This procedure has been advocated in Terborgh's attempt to solve the problem of replacement where future obsolescence is expected.¹ All technical progress is represented as taking the form of a reduction in the direct costs of output with new assets, the initial costs of the assets and the additional costs of output with them as they grow older remaining the same for all assets. Terborgh then is able to suggest a procedure for taking this expected reduction into account when making replacement decisions.

As any given asset grows older the cost of operating it is likely to rise, because of declining technical efficiency or the need to spend more on its maintenance; at the same time the cost of operating the best available new asset falls, owing to technical progress. The amount which would be saved in operating costs per year if the old asset were replaced is therefore the sum of two quantities—the difference between the present cost of operating the old asset and the cost of operating it when it was new, and the difference between the cost of operating the old asset when new and that of operating the new assets now available. This sum may be called the "avoidable direct costs" of continuing to operate the old asset. Terborgh's procedure is to formulate the costs which are relevant to replacement policy when obsolescence is present as the initial cost of the asset, the direct costs of operating it when new, incurred throughout the life of the asset at a constant rate, and the "avoidable

¹Terborgh, *op. cit.*

direct costs," incurred throughout the life of the asset, generally at a rising rate. The lifetime of the asset should then be chosen so as to minimize the average cost of the asset, defined as the cost which, incurred at a uniform rate over the life of the asset, would be equivalent to the sum of these three elements; an old asset should be replaced when its direct costs are greater than minimized average costs of the new asset, defined as above.

It can be shown, however, that Terborgh's method is only made legitimate by his assumption that technical progress reduces the direct costs of production with a new asset by a constant amount each year.¹ *Prima facie* it would appear more plausible, if some assumption has to be made about the future course of direct costs, to forecast a constant percentage reduction each year. A constant actual reduction can, however, be used as a fairly good approximation to a constant percentage reduction, provided that the percentage is not too great and the period over which the two are compared not too long.² It should further be stressed that the assumption of linearity does not represent an accurate forecast but only the firm's guess about the likely pace of advance; if its expectations about the nature of new assets are more definite they should be included in the analysis.

III. THE RATE OF DISCOUNT.

The previous section was concerned with the case where firms were uncertain about the nature of the assets which would be available in the future. But having suggested a way in which the firm's estimate of the rate of obsolescence could be represented it treated the firm's expectations of future costs as if they were single valued. This inconsistency requires correction.

It is sometimes suggested that allowance should be made for uncertainty by treating expectations as if they were single

¹See Mathematical Appendix, Part II.

²Let the initial level of direct costs be c , and let the yearly proportional reduction be k , so that costs after t years are:

$$c(1-k)^t = c \left\{ 1 - kt + \frac{t(t-1)}{2!} k^2 - \frac{t(t-1)(t-2)}{3!} k^3 + \dots + (-1)^t k^t \right\}$$

Provided that $kt < 1$ by a wide margin the terms after $1 - kt$ are small in comparison with $1 - kt$, and costs after t years can therefore be approximated by $c(1 - kt)$.

valued but increasing the rate of discount used in calculating the present value of costs and revenues. This will tend to delay replacement which would appear profitable if the lending rate of interest¹ were used as the rate of discount, and to lengthen the ex-ante economic life of equipment. But the use of a rate of discount other than that at which the firm can lend money raises some difficulties.

The present value of the net receipts from a chain of assets may be calculated in one of two ways: the excess of current receipts over current costs may be calculated for each period, discounted and added, and from the sum of these discounted receipts may be subtracted the discounted capital costs of acquiring new assets; or amortization quotas, sufficient when accumulated at the lending rate of interest over the life of an asset to pay for the asset which replaces it, may be subtracted from the current income of each period to give disposable income for that period, and the disposable income discounted period by period and added. When the rate of discount is equal to the lending rate of interest, the present value of the receipts from the chain is affected neither by the choice of method used for calculating it nor, if the second method is chosen, by the way in which the amortization quotas are distributed among the different periods in the life of the asset, provided that they are sufficient to cover the costs of replacement. The quotas can therefore be chosen in such a way as to make the flow of disposable income constant over the life of the equipment and this flow, expressed as a proportion of the initial capital outlay in purchasing the first asset of the chain, represents the

¹The lending rate of interest is used here to mean the highest rate which the firm can earn on reserve funds such as amortization quotas, whether these are used for lending, for repaying debt or for reinvestment within the firm. It should be noticed that when the firm is operating a stock of assets of uniform age distribution, the amortization quotas are being continually reinvested within the firm itself (through the purchase of new assets) and earn the same rate of profit as that being earned by the firm. Since this rate cannot be less than that at which the firm discounts the future, if the firm finds it worth its while to continue investing in this line of production, the problems discussed later in this Section cannot arise. See N. Kaldor, "The Recent Controversy on the Theory of Capital," *Econometrica*, 1937, pp. 209-211

rate of return on this outlay consistent with "maintaining capital intact."¹

Where, however, the rate of discount is higher than the rate at which amortization quotas can be accumulated, the present value of the future net receipts from the chain of replacements will be higher when calculated on the first method than when calculated on the second. There will be some discount rate, say $R\%$, which will make the present value of the net receipts, calculated on the first method, just equal to the costs of the first asset in the chain; but if the asset is acquired it will not be possible to draw from it an income at the rate of $R\%$ per year on its cost without continually borrowing additional sums to finance replacement.²

¹"Maintaining capital intact" in the sense of being able to finance replacement out of internal reserves is not necessarily equivalent to maintaining the total value of the firm's assets. Let V_k be the value at the end of period k of the firm's expected stream of net receipts after that date, and let us suppose that in order to maintain capital intact the firm plans to hold an amount R_k in reserve at the end of period k , such that $V_k + R_k = V_0$, where V_0 is the value of expected net receipts at time O , just after the first asset in the chain has been installed.

Let C be the capital cost of the first replacement, and let V_{T-} and V_{T+} be the value of expected net receipts just before and just after the time of replacement T . Then it is clear that:

$$V_{T+} = V_{T-} + C$$

$$\text{and } R_{T-} = V_0 - V_{T-} = C + (V_0 - V_{T+})$$

Thus the reserves which have been set aside to maintain the value of the firm's assets may be either more than or less than the reserves which would be set aside to enable replacement just to be financed from the firm's own amortization reserves.

²This point may be illustrated by a numerical example. Suppose that an investment in an asset costing £100 will yield £60, £40, £30 and £20 in the four years of its life. It is then replaced by an identical asset. The rate of discount is 20 per cent, the lending rate of interest 5 per cent. Using the convention that costs and revenue accrue at the end of the period in which they are incurred or earned, the present value of the receipts from an infinite chain of such assets is:

$$\left\{ \frac{60}{1.2} + \frac{40}{(1.2)^2} + \frac{30}{(1.2)^3} + \frac{20}{(1.2)^4} \right\} \left\{ 1 + \frac{1}{(1.2)^4} + \frac{1}{(1.2)^8} + \dots \right\} = 202.5$$

The present value of the cost of the chain is:

$$100 \left\{ 1 + \frac{1}{(1.2)^4} + \frac{1}{(1.2)^8} + \dots \right\} = 193.2$$

The present value of the receipts of the chain is therefore greater than the present value of its costs, when both are calculated at a 20% rate of discount.

On the other hand the investment cannot be made to yield a 20 per cent flow of disposable income. If £20 per year is paid out as disposable income the amortization fund at the end of four years will amount to $£40 \times (1.05)^3 + £20 \times (1.05)^2 + £10 \times 1.05 = £78.9$ which is less than the cost of the new asset to be bought then. In fact the highest level of income which could be made available per year while making adequate provision for financing replacement from internal reserves would be about £15.1.

Since it is unlikely that the firm will plan such continual borrowing it is probable that it will use the second method, which considers the present value of the stream of disposable income after provision has been made for the finance of replacement. This, however, raises the difficulty that the way in which amortization quotas are deducted over the life of the asset will affect the present value of the stream of disposable income. If the rate of discount is higher than the rate of interest which the firm can earn on its amortization quotas the present value of the stream of disposable income will be highest when the setting aside of amortization quotas is postponed as long as possible consistent with the financing of replacement; all the current receipts earned by the asset in the earlier years of its life will be regarded as disposable income, and all the current receipts of later years will be allocated to amortization reserves. Alternatively, and perhaps more realistically, the firm may plan to allocate amortization quotas in such a way that disposable income per period is constant over the life of the asset. But whichever procedure is followed it is likely to be disposable income which is of interest to the firm, rather than a concept of income which implies constant borrowing.

The type of difficulty outlined in this section is of particular importance when expectations of a continuing rise in prices are taken into account. Hitherto constant prices have been assumed throughout, so that there was no difference between maximizing the present value of future money receipts and maximizing the present value of future real receipts. Let us, however, now suppose that all prices are expected to rise at a rate of s per year; and let us assume that the rate used by the firm in discounting the future is the same as the rate of interest

If the net revenues expected in successive years, expressed in constant prices, are $Q_1, Q_2, Q_3, \dots, Q_n, \dots$ (some of which may be negative), then these revenues expressed in terms of market prices will be $Q_1(1+s), Q_2(1+s)^2, \dots, Q_n(1+s)^n, \dots$. If the policy of the firm is to maximize the present value of its money receipts the rate of discount r will be applied to this second series. If r and s are both small this is approximately equivalent to applying the rate of discount $(r - s)$ to the first series; so that the expectation of a rise in prices by a

certain (small) percentage per period has the effect of reducing the effective rate of discount on future costs and receipts, measured in terms of constant prices, by this percentage.

Maximizing the present value of future money receipts is not a probable aim when the value of money is expected to fall. More plausible would be the assumption that firms try to maximize the present value of future real receipts. If so, the rate of discount r will be applied to the series of revenues expressed in constant prices; the effective rate of discount applied to future money receipts will be approximately $r + s$. Since amortization quotas can only be invested at the rate of interest r^1 , the problems which arise when using a high rate of discount as an allowance for risk are encountered again; even though the expected net revenues from a chain of assets, discounted at a rate of $r + s$, may exceed the cost of starting the chain, it may not be possible to draw a disposable income representing a return of $r + s$ on the initial outlay, without running down capital.

As before, it is probably (real) disposable income that is of interest to the firm, and this will be affected by the procedure used for deducting amortization quotas. This procedure in turn will be affected by the weights which the firm attaches to the regularity with which disposable income is received, and to the avoidance of indebtedness. Unless these weights are known, the way in which disposable income is released over the life of an asset is undefined. The maximization of expected disposable income is therefore an unambiguous criterion only when it does not matter how the income earned in excess of that required to provide for amortization is released as disposable income over the life of the asset; and in a time of inflation this is only the case when amortization quotas can earn, in money terms, the rate at which the firm is discounting real disposable income *plus* the rate at which prices are rising.

University of Manchester.

WILLIAM PETERS.

¹Unless they can be reinvested within the firm—*cf.* footnote p. 283.

MATHEMATICAL APPENDIX.

I. COST MINIMIZATION WITH AN EVENLY STAGGERED STOCK OF ASSETS

Consider an evenly staggered stock of assets, being used to produce a given output Q . Let C be the initial cost of an asset, and let $c(t)$ and $q(t)$ be its direct costs per period and its rate of output per period respectively when it is t periods old. The period chosen is sufficiently short for the costs and output of a period to be regarded as occurring at a single moment at the end of the period.

If M replacements take place per period, we have :

$$Q = M \{ q(0) + q(1) + \dots + q(T-1) \} \dots\dots\dots(1)$$

where T is the length of life of a single asset.

Total costs per period ($= K$) are given by :

$$K = M \{ C + c(0) + c(1) + \dots + c(T-1) \} \dots\dots\dots(2)$$

Eliminating M from (1) and (2),

$$\frac{K}{Q} = \frac{C + \sum_{t=0}^{T-1} c(t)}{\sum_{t=0}^{T-1} q(t)} \quad \text{i.e., } K = \frac{C + \sum_{t=0}^{T-1} c(t)}{\sum_{t=0}^{T-1} q(t)} \cdot Q$$

Since Q is given, the lifetime of equipment which minimizes K is then given by :

$$\frac{c(T)}{q(T)} = \frac{C + \sum_{t=0}^{T-1} c(t)}{\sum_{t=0}^{T-1} q(t)} ;$$

i.e., replacement is due when the direct costs per unit of operating the asset are equal to the total costs incurred over the life of the asset divided by the total output over the life of the asset. A decline in capacity *unaccompanied* by an increase in costs per unit does not hasten replacement.

II. REPLACEMENT CRITERIA WHEN FURTHER OBSOLESCENCE IS EXPECTED

Let the cost of a new asset be K .

Let the difference between the direct costs of an asset when it is t periods old and its direct costs when it is new be $m(t)$.

Let the direct cost of the asset available at time 0 be c when it is new : i.e., the direct cost of this asset when it is t periods old will be $c + m(t)$.

Let the direct cost of the asset available at time v when new be less than the direct cost of the asset available at time 0 when new by $\mu(v)$: i.e., the direct cost of this asset will be $c - \mu(v)$ when it is new and $c - \mu(v) + m(t)$ when it is t periods old.

Let T_1, T_2, T_3, \dots be the times of successive replacements.

In accordance with the representation of obsolescence adopted in the text, the initial cost K and the function showing the rate of increase of direct costs $m(t)$ are the same for all assets in the chain; the rate of obsolescence is shown by the rate at which $\mu(v)$ increases over time.

Replacement times T_1, T_2 , etc., must be chosen so as to minimize costs, where these are given by:

$$K + \underbrace{\sum_{t=0}^{T_1} \frac{c + m(t)}{(1+r)^t}}_{\text{costs of first asset}} + \underbrace{\frac{K}{(1+r)^{T_1}} + \sum_{t=T_1}^{T_2} \frac{c - \mu(T_1) + m(t - T_1)}{(1+r)^t}}_{\text{costs of second asset}} + \dots$$

By adding and subtracting $\sum_{t=0}^{\infty} \frac{\mu(t)}{(1+r)^t}$, this can be rewritten as:

$$K + \sum_{t=0}^{T_1} \frac{c + \mu(t) + m(t)}{(1+r)^t} + \frac{K}{(1+r)^{T_1}} + \sum_{t=T_1}^{T_2} \frac{c + \mu(t) - \mu(T_1) + m(t - T_1)}{(1+r)^t} + \dots - \sum_{t=0}^{\infty} \frac{\mu(t)}{(1+r)^t} \dots \dots \dots (3)$$

where the last term is unaffected by replacement policy.

If (but only if) $\mu(x) - \mu(y) = \mu(x - y)$, expression (3), less the last term (which is unaffected by replacement policy), may be written:

$$K + \sum_{t=0}^{T_1} \frac{c + m(t) + \mu(t)}{(1+r)^t} + \frac{1}{(1+r)^{T_1}} \left\{ K + \sum_{t=0}^{T_2 - T_1} \frac{c + m(t) + \mu(t)}{(1+r)^t} \right\} + \dots \dots \dots (4)$$

It is evident that the problem of choosing the dates of replacement so as to minimize (4) is exactly the same as the problem of choosing the dates of replacement for an infinite chain of assets of the same type, when these have an initial cost of K , a direct cost when new of c , and a direct cost when they are t periods old of $c + m(t) + \mu(t)$. The optimum lifetime of each asset under these conditions is, as previously seen, that which minimizes the "average costs" of the asset.

Let these average costs be A per period, and let the direct costs of an existing asset be G per period. Then if the asset is replaced at once, costs will be:

$$C_1 = \sum_{t=0}^{\infty} \frac{A}{(1+r)^t} - \sum_{t=0}^{\infty} \frac{\mu(t)}{(1+r)^t}$$

If replacement is delayed by one period, costs will be:

$$C_2 = G + \sum_{t=1}^{\infty} \frac{A}{(1+r)^t} - \sum_{t=1}^{\infty} \frac{\mu(t)}{(1+r)^t} \doteq C_1 + (G - A)$$

Thus the requirement of cost minimization gives the Terborgh result—an old asset should be replaced when its direct costs are greater than the average costs of a new asset, where these are so defined as to include obsolescence as a cost. But this result can only be reached by assuming that obsolescence takes the form of a constant rate of decline in direct costs with time, since only this assumption enables us to put $\mu(x) - \mu(y) = \mu(x - y)$ and so to write the terms in (3) which depend on replacement policy in the form (4).

House Building in the South Wales Coalfield, 1851-1913¹

SUMMARY.

This paper attempts to plot the course of residential building in the South Wales Coalfield ² during the period 1851-1913. The primary material is similar to that used by the late Mr. Bernard Weber in his path-breaking article, "A New Index of Residential Construction, 1838-1950." ³

One of the duties imposed on local authorities by the Health Act of 1848 was the drawing up, and enforcement, of Building Bye-Laws, based on model bye-laws issued by the Central Board of Health. Before any building could be erected, the local boards, guided by the Surveyors, had to approve the plan. Many local authorities have records showing details of the plans approved, and these form the main source of our information.

A local board was set up only after an area had attained a certain degree of urbanisation. In 1851, the only towns in our region which had local boards whose records are still preserved were Cardiff and Swansea. Aberdare and Newport have records from 1855, and Merthyr Tydfil from 1856. No more local board records have been found for the years before 1865, and it is 1878 before there are as many as ten different series. The available information, therefore, covers only the larger towns in the earlier years, but eventually comprises the whole of the coalfield and its dependent ports. Undoubtedly, from 1865 onwards, most of the building was in towns covered by the information available to us; but there was other building, unhampered by these bye-laws, or of which we have no record, in other areas.

Plans submitted to the local boards were recorded by the Surveyor in a Register of Plans. The exact content and

¹This paper is based on work being done by Mr. Richards for inclusion in an M.A. thesis to be presented to the University of Wales. The authors are grateful to Professors Brinley Thomas and Arthur Lewis for their help and interest.

²The area is defined more fully in Appendix I.

³Published in the *Scottish Journal of Political Economy*, Vol. II, No. 2, June, 1955, pp. 104-132.

usefulness of these registers varies from place to place, but generally the register gives the plan number, the type of building proposed, the site, the date on which the plan was submitted, the date on which it was approved or rejected, and the name of the person for whom the building is being done. Some of the Registers give the dates of commencement of building, of inspection of drains and damp courses, and of completion; but unfortunately this information was rarely recorded with sufficient consistency for it to be of much use.¹ Generally the plans were entered in the order of submission; but sometimes they were entered under street names, which made the study of particular streets very easy, but complicated the task of ascertaining how many plans were approved in a particular period for the whole town. In other cases the register was not preserved.

Fortunately, however, democracy generates the duplication of records. Not only did the Surveyor mark his register "approved" or "rejected," but his committee made some note of the matter in the minutes. Sometimes it was the Works and Sanitary Committee. At other times the Road and Bridges Committee, while one authority, with a strangely modern touch, had a Housing and Plans Committee. The minutes of these committees were usually well kept. Often, however, the committee was, in fact, a committee of the whole council, and in such cases the records of plans approved is to be found in the minutes of the Council itself. The information to be obtained from these depends to a great extent on the standard set by the first Clerk. Some contain a copy of the Surveyor's Monthly Report; others give a list of plans approved each month; yet others, intent on economy, record baldly that "the Surveyor's Report was read" or that "all the plans mentioned in the Surveyor's Report were approved." This form of economy was widely practised in North Monmouthshire.

But if economy was in the air, so was public health, and many of the M.O.H. reports for the local areas were written by doctors whose liking for statistics rivalled that of Florence

¹Amongst the areas with really complete records are Merthyr Tydfil, the Rhondda, and Llantrisant and Llantwit Fardre. These records are now being examined in greater detail.

Nightingale herself. Some of these give the number of houses built in each year ; others the number planned. Some give the number inhabited at the end of each year. Usually these reports gave figures for the calendar year and the monthly material available from the more primary sources just mentioned has therefore been collected on this basis. For Cardiff, however, the information is for years ending 31st August. This particular series is given in Table I but is not included in any of the composite indices.

In a few areas we have series showing both the number of house plans approved and the number of houses actually built. Examination of these suggests that, on an average, houses took about nine months to pass from the planning to the completion stage, and that about a tenth of the houses planned were never built. In the two cases where we have failed to find complete records of plans approved, we have been able to obtain data about houses built. This information has been used to estimate series of plans approved for Mountain Ash (1903-1914) and Aberdare (1909, 1910, 1913 and 1914). In Mountain Ash, the amount of building going on in these areas during the years covered by these estimates was considerable. Where the houses concerned were Council houses, the number of plans has been taken as identical with the number of houses built in the following year.

Because the series of house plans approved for the different local boards begin in different years it is not possible to reach any useful conclusions by simply adding the series together. We can, however, obtain a useful series for four towns (Swansea, Newport, Aberdare and Merthyr Tydfil) beginning in 1856. This series, expressed in *per capita* terms, is shown in Diagram I. Although it relates to building in only four towns, it is probably a reasonably good indicator of house-building in the South Wales Coalfield, including, as it does, two ports (one of which was so concerned with metal industries and both with coal), a predominantly coal area, and a large iron area.

Diagrams I and II also show indices for six towns (the four just mentioned and Llanelly and Mountain Ash) commencing in 1867 ; for fifteen towns commencing in 1881 ; for twenty towns commencing in 1887 ; and for twenty-eight towns

DIAGRAM I.

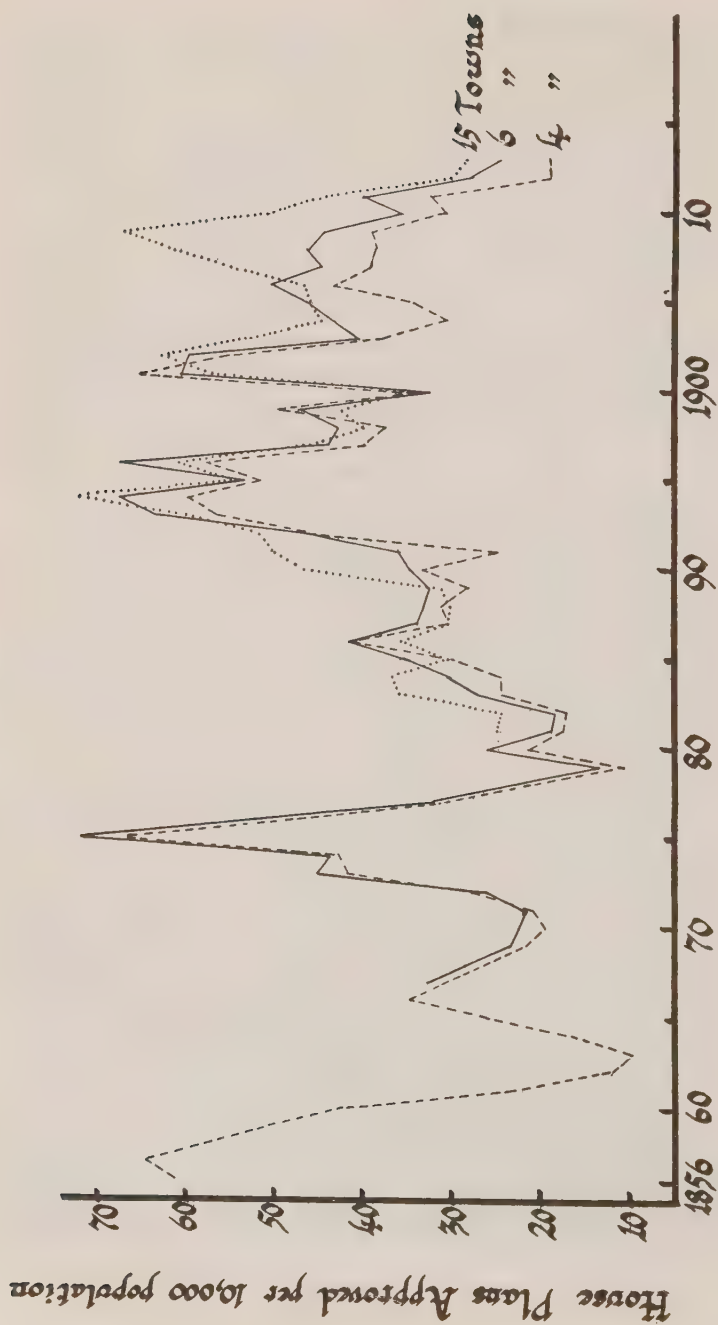
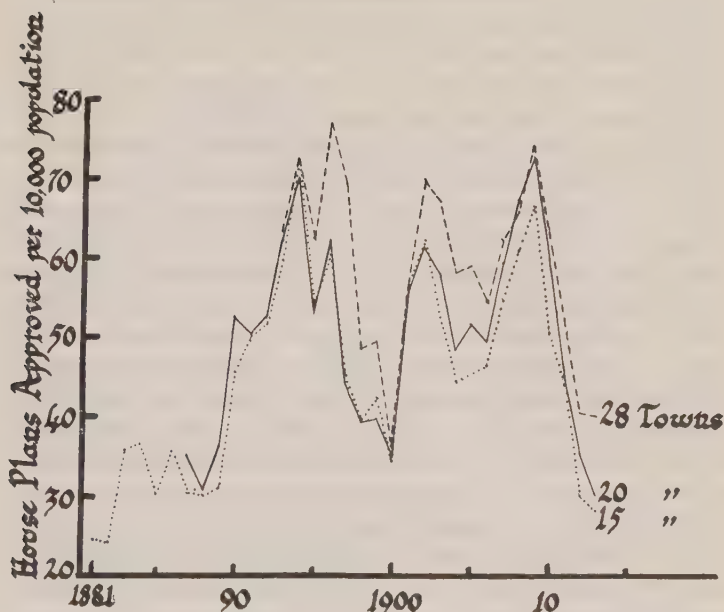


DIAGRAM II.



commencing in 1893. The composition of these indices is shown in Appendix I. In each the number of house plans approved has been divided by an estimate of the population.

Unfortunately it is far from easy to obtain annual estimates of population of local board areas. In some cases local M.O.H. reports contain population estimates which appear to be fairly reasonable. But usually the estimate has gone more and more awry as the last Census has passed further into history ; houses were far easier to count than people.

Considerable time was spent on this aspect of the problem and many methods were tried before a decision was finally taken. In each case we began by obtaining the population of a local board area in two consecutive Census years. The figures have been easily available for 1871 onwards, but "plans approved" series exist for seven areas before that date. For most of these the local board area has been easily identified with areas for which the earlier Censuses give population

figures ; but in the case of Mountain Ash (whose plans approved series begins in 1867) it was quite impossible to perform such an identification, and the 1871 population had to be projected backwards for a few years on an arbitrary basis.

The main difficulty was that of estimating the population in the inter-census years. One method we considered was that of relating the annual change in population to the amount of house building going on. Thus, if the inter-censal increase in population was 1,000, and the total number of plans approved during this period was 200, then in a year in which 30 plans were approved, we would assume that the population increase was 150. A reasonable modification of this would be to let the increase in population occur in the year before the plans were approved, since the building of houses might very well have lagged behind population increase. Unfortunately there were several difficulties. In some cases there was a decrease in population accompanied by an increase in the number of houses (probably due to emigration from one part of the area, leaving empty houses, and a lesser immigration to another part of the same area, where there was a housing shortage, but perhaps, an expanding industry). A second difficulty arises the moment we consider the earlier years of any series. For example, the Penarth series of plans approved starts in 1877. The method we have just outlined can be used from 1881 onwards, but since we know nothing about the number of plans approved between 1871 and 1876 our method is inapplicable in the first few years. Boundary changes cause further trouble. Any one of these difficulties by itself could be surmounted with a reasonable degree of confidence ; but when the three complications occur within one single area, the prospect is dark. One way around these objections would be to make a study of the economic development of the separate areas, relating population change not only to house planning but also to the opening and closing of mines and iron works. But the immense amount of labour involved, and the persisting uncertainty about the final product, made us decide against attempting this Herculean feat.

Various modifications of the above method were considered, and the estimates were made for some of the more manageable towns, but eventually it was decided that one big devil is

preferable to a lot of little ones. We fell back on linear interpolation. The only difficulty here arises out of boundary changes, and we surmounted it as follows. Suppose that in 1891 an area has a population of 10,000 and that a boundary change occurs in 1897. This new area has a population in 1901 of 12,000 and the 1901 Census reports that in 1891 its population was 10,400. We assume that the population of the new area increased uniformly from 10,400 in 1891 to 12,000 in 1901. This gives an estimated population of 11,360 for the new area in 1897; 11,520 for 1898, etc. For the population of the old area in 1891-96 we assume that the 1891 population increased annually by the average increase of the preceding decade. For the particular area concerned, this procedure is unlikely to give a highly accurate result; but except in the 'nineties there were never many boundary changes in the same decade, and the error becomes of less importance in the aggregate. Where there is reason to believe that linear interpolation gives us a population figure that is too low, the *per capita* index will be too high, and *vice versa*. Careful examination of the raw data and of all reasonable departures of the population from our estimates has suggested that none of the important peaks or troughs in our series occupies a wrong position.

We may now consider these fluctuations. The immense peak in the late 'fifties in the Four Towns series reflects, in particular, the building boom in Swansea and Aberdare. In the former town, whose population grew from 25,000 in 1851 to 34,000 in 1861, over 700 houses were planned in 1858, the total for the years 1857-1860 being over 1,400. In Aberdare, where the population rose from 15,000 in 1851 to 32,000 in 1861, there were over 453 houses planned in 1855, 392 planned in 1856, 234 in 1857, 97 in 1858 and 164 in 1859. In Newport, a town of about 23,000 people, 130 houses were planned in 1858. In Merthyr Tydfil 198 houses were planned in 1856, 293 in 1857 and 163 in 1858 at a time when the population was about 49,000. The trough of the early 'sixties, the subsequent minor peak, and the trough of the early 'seventies are all common to Cardiff and to each of the Four Towns; but the peak of the mid-'seventies arose chiefly out of very high activity in Swansea and high

activity in Aberdare and Newport. The late 'seventies saw depression in Cardiff and each of the Four Towns.

The period from the late 'seventies until the early 'nineties saw a great increase in building activity which, thanks largely to the development of new collieries, safely absorbed the trade cycle whose peak was in the mid 'eighties. The last decade of the century began with feverish activity in Barry, and the continued growth of new colliery towns. In Swansea there was quite a sizeable peak when 479 houses were planned in 1893—when the population was about 91,000. Aberdare, after a decade of almost zero activity, reached a peak in 1894 with 200 houses, for a population of 40,000. About the same time Cardiff reached a peak with 1,500 houses in 1895. Newport, with 760 houses planned in 1896, when its population was about 61,000 reached its highest-ever *per capita* figure; and Merthyr Tydfil leapt to its greatest heights between 1899 and 1902, when 3,000 houses were planned in four years for a population of 70,000.

At this time, when Merthyr Tydfil attained its zenith, building in almost all other towns was low. The two short cycles which characterised the pre-war years were most marked in the new colliery towns.

Finally we may compare our results with those of Weber. In 1863, when Cardiff, Swansea, Aberdare, Newport and Merthyr Tydfil were all in a trough year, Weber's index (which included at this time Birkenhead, Birmingham, Bradford, Hull, Liverpool, London, Newport (Mon.) and Wolverhampton) showed a minor peak. The peak around 1867 corresponds roughly to a trough in Weber's series (which then had a slightly wider coverage), and the trough in 1870 to a minor peak. But in 1875 comes a prominent peak common to Weber's series and to our own series. The downswing in the second half of the 'seventies reached bottom sooner in South Wales (as far as we can judge from our 4-Town, 6-Town and 15-Town series) than in the towns covered by Weber; and the 'eighties witnessed a fluctuating but definite increase, leading to a boom in the 'nineties which anticipated the national boom by five or six years, and lasted that much longer. But the trough of 1900 was all the more severe. Indeed, in South Wales we cannot

describe this as anything but a major trough, while in Weber's index it is nothing more than a ripple caused by the Boer War. The steady decline of 1902-1914 in the national index has no real counterpart in South Wales, as a whole, although in some towns such as Cardiff, for example, it was very apparent.

The examination of the various components of the South Wales and national indices has not yet been undertaken with the careful attention necessary to formulate any definite conclusions, but it seems very likely that between 1880 and 1914 the course of construction in South Wales was dominated by fluctuations in the export sector which in turn was positively correlated with the building cycle in the United States. The analysis suggested that, whereas the index of building in Great Britain as a whole moved inversely to that of building in the United States, the course of building in South Wales was not in line with that of the aggregate. The South Wales building cycle was export-determined.

J. HAMISH RICHARDS,

J. PARRY LEWIS.

*University College,
Cardiff.*

TABLE I
HOUSE PLANS APPROVED

	Cardiff		Swansea		Newport		Aberdare		Merthyr Tydfil	
	Plans approved	Plans per 10,000	Plans appr.	Plans per 10,000	Plans appr.	Plans per 10,000	Plans appr.	Plans per 10,000	Plans appr.	Plans per 10,000
1851...	380	234	272	109						
2...	328	185	252	98						
3...	190	99	199	74						
4...	123	59	100	36						
5...	192	86	82	29	93	42	453	207		
6...	356	150	51	17	114	51	392	166	198	41
7...	284	112	187	62	103	45	234	92	293	61
8...	240	90	704	225	139	59	97	36	163	33
9...	160	57	255	79	76	32	164	57	183	37
60...	83	28	272	82	20	8	153	50	131	27
1...	40	13	159	47	35	14	66	20	69	14
2...	40	12	92	25	11	4	58	18	12	2
3...	16	4	87	23	10	4	36	11	12	2
4...	60	15	155	39	16	6	68	20	7	1
5...	107	26	193	47	47	18	128	38	25	5

Table I—(Contd.)

	Cardiff		Swansea		Newport		Aberdare		Merthyr Tydfil	
	Plans approved	Plans per 10,000	Plans appr.	Plans per 10,000	Plans appr.	Plans per 10,000	Plans appr.	Plans per 10,000	Plans appr.	Plans per 10,000
1866...	59	13	243	57	54	20	200	58	40	8
7...	152	32	268	60	89	32	73	21	59	12
8...	152	31	215	46	91	32	67	19	45	9
9...	130	25	184	38	76	26	37	11	60	12
70...	n.a.	n.a.	199	40	69	23	37	10	19	4
1...	277 (277)	48 (48)	214	41	38	13	41	11	58	11
2...	251 (251)	42 (42)	213	40	72	24	43	12	144	28
3...	270 (273)	43 (44)	337	62	56	18	164	46	162	32
4...	531 (539)	82 (83)	380	68	87	28	187	53	90	18
5...	635 (648)	94 (96)	820	143	163	51	156	44	26	5
6...	509 (552)	73 (79)	365	62	172	53	134	38	176	35
7...	596 (611)	82 (84)	330	55	191	58	10	3	17	3
8...	553 (564)	74 (75)	189	31	151	45	5	1	40	8
9...	585 (618)	75 (80)	113	18	67	20	5	1	10	2
80...	762 (771)	95 (96)	129	20	118	34	5	1	137	28
1...	860 (904)	104 (109)	179	27	84	24	2	1	56	12
2...	(686)	(79)	192	28	87	23	2	1	41	8
3...	(980)	(107)	123	17	203	52	1	0	147	29
4...	(1445)	(150)	190	26	243	60	3	1	51	10
5...	(1345)	(133)	218	29	189	45	29	8	180	34
6...	(1201)	(113)	273	35	349	79	12	3	231	43
7...	(1226)	(111)	390	48	139	30	39	11	87	16
8...	(1062)	(92)	382	46	275	58	6	2	34	6
9...	(603)	(50)	414	48	110	22	10	3	107	19
90...	(745)	(60)	422	48	183	34	15	4	163	29
1...	(730)	(57)	288	32	114	21	36	9	158	27
2...	(990)	(75)	420	46	433	77	77	20	193	33
3...	(1456)	(107)	479	53	594	104	79	20	247	41
4...	(1206)	(86)	459	50	544	93	200	50	297	48
5...	(1507)	(105)	473	50	515	86	158	39	162	26
6...	(1196)	(81)	319	35	760	125	180	44	222	35
7...	(1247)	(83)	134	14	522	84	125	30	255	39
8...	(1258)	(82)	62	7	390	61	91	22	446	68
9...	(624)	(40)	63	7	300	46	140	33	824	123
1900...	(267)	(17)	47	5	307	47	149	35	419	62
1...	(230)	(14)	89	9	567	84	109	25	1023	148
2...	(185)	(11)	244	26	410	59	161	37	720	102
3...	(398)	(24)	182	18	365	52	253	56	283	40
4...	(228)	(13)	145	14	426	59	64	14	251	34
5...	(389)	(23)	393	38	298	40	149	32	181	25
6...	(291)	(17)	305	29	496	66	329	70	185	25
7...	(222)	(13)	226	21	481	62	259	54	501	66
8...	(307)	(17)	514	47	427	54	233	48	305	39
9...	(377)	(21)	447	40	319	40	120	24	632	80
10...	(307)	(17)	449	40	261	32	88	18	424	53
1...	(208)	(11)	440	38	244	29	94	18	530	65
2...	(325)	(18)	311	27	171	20	98	19	209	26
3...	(325)	(17)	302	25	199	23	137	26	158	19

The figures in brackets for Cardiff relate to "Houses and Shops."

TABLE II
SOUTH WALES BUILDING

4 Towns		6 Towns		15 Towns		20 Towns		28 Towns	
Plans approv.	Plans per 10,000	Plans approv.	Plans per 10,000	Plans approv.	Plans per 10,000	Plans appr.	Plans per 10,000	Plans appr.	Plans per 10,000
755	61.1								
817	64.3								
1103	84.5								
678	50.6								
576	41.9								
329	23.3								
173	12.0								
145	9.9								
246	16.5								
393	25.8								
537	34.6								
489	30.9	581	32.6						
418	26.0	515	28.3						
357	21.8	428	23.1						
324	19.4	416	22.1						
351	20.7	414	21.6						
472	27.6	503	25.9						
719	41.7	883	45.0						
744	42.8	874	44.0						
1165	66.5	1433	71.4						
847	48.5	1070	52.7						
548	30.8	644	31.4						
385	21.5	444	21.4						
195	10.8	274	13.1						
389	21.4	534	25.3						
321	17.5	398	18.6	914	24.6				
322	17.0	402	18.2	938	24.4				
474	24.3	611	26.9	1421	35.9				
487	24.3	702	30.0	1494	36.7				
616	29.9	826	34.3	1254	30.3				
865	40.8	1017	41.1	1517	35.7				
655	30.1	862	33.9	1320	30.2	1800	35.1		
697	31.3	861	33.0	1347	30.1	1627	30.9		
641	28.0	869	32.4	1424	31.0	1965	36.4		
783	33.1	958	34.6	2217	46.8	2849	52.6		
596	24.7	1010	35.7	2435	50.2	2819	50.8		
1123	45.9	1298	45.2	2553	51.8	2984	52.8		
1399	56.4	1859	63.5	3036	60.0	3658	62.6	4249	63.3
1500	59.7	2012	67.6	3738	72.4	4203	70.5	5009	72.9
1308	51.4	1614	53.4	2829	54.2	3263	53.8	4406	62.8
1481	57.4	2068	67.3	3226	60.7	3868	62.5	5554	77.4
1036	39.7	1367	43.8	2477	45.8	2833	44.9	5119	69.8
989	37.4	1363	43.0	2202	40.0	2526	39.3	3650	48.7
1327	49.5	1513	47.0	2396	42.7	2595	39.7	3821	49.9
922	34.0	1060	32.5	1978	34.7	2329	35.0	2830	36.2
1788	65.1	1990	60.1	3326	57.3	3811	56.3	4517	56.7
1535	54.8	2005	59.2	3739	62.7	4382	62.9	5779	70.2
1083	37.9	1414	40.9	3231	52.9	4175	58.3	5745	67.6
886	30.4	1529	43.3	2824	44.8	3606	48.8	5158	58.6
1021	34.4	1660	46.0	2958	45.8	3943	52.0	5377	59.3
1315	43.5	1849	50.1	3107	46.9	3820	49.0	5123	54.8
1467	39.1	1682	44.9	3707	55.1	4743	59.8	6014	62.9
1479	38.7	1769	46.2	4283	61.5	5561	67.8	6573	66.4
1518	39.0	1744	44.8	4767	67.0	6143	73.1	7590	74.6
1222	30.8	1408	35.5	3704	50.8	5198	60.4	6611	63.3
1308	32.3	1578	39.0	3286	44.1	4003	45.5	5674	52.9
789	19.0	1129	27.5	2300	30.3	3193	35.5	4473	40.8
796	19.0	1016	24.3	2215	28.5	2773	30.2	4560	40.6

APPENDIX I.

The following notes show the areas included in each series. With the exception of Aberavon M.B. and Oystermouth U.D.C. (which no longer exist), the present name of the Authority is used.

The date given after the name of the Authority is the year in which that local series begins.

Four Town Series (1856-1913) : Swansea C.B. (1851), Newport C.B. (1855), Aberdare U.D.C. (1855), Merthyr Tydfil C.B. (1856).

Six Town Series (1867-1913) : The above plus : Llanelly M.B. (1865), Mountain Ash U.D.C. (1867).

Fifteen Town Series (1881-1913) : The above plus : Blaenavon U.D.C. (1873), Ebbw Vale U.D.C. (1875), Penarth U.D.C. (1877), Rhondda M.B. (1880), Tredegar U.D.C. (1880), Neath M.B. (1880), Abertillery U.D.C. (1881), Neath R.D.C. (1881), Rhymney U.D.C. (1881).

Twenty Town Series (1887-1913) : The above plus : Maesteg U.D.C. (1882), Glyncoirwg U.D.C. (1883), Mantyglo and Blaina U.D.C. (1886), Llchwyr U.D.C. (1886), Pontypridd U.D.C. (1887).

Twenty-Eight Town Series (1893-1913) : The above plus : Ogmore and Garw U.D.C. (1888), Bedwellty (1889), Llantrisant and Llantwit Fardre R.D.C. (1890), Caerphilly U.D.C. (1890), Barry M.B. (1891), Oystermouth U.D.C. (1892), Aberavon M.B. (1892), Gelligaer U.D.C. (1893).

The following data are also available but are not used in this paper :

Llanelly R.D.C. (1894), Crickhowell R.D.C. (1894), Bridgend U.D.C. (1895), Risca U.D.C. (1895), Penybont R.D.C. (1895), Cowbridge R.D.C. (1896), Pontardawe R.D.C. (1899), Mynyddislwyn U.D.C. (1902), Burry Port U.D.C. (1902), Abercarn U.D.C. (1894-1906 and 1911-1913).

No figures are available for the Bridgend U.D.C., Blaenavon U.D.C. and Penybont R.D.C. areas in 1913.

Aberavon Borough and Margam U.D.C. were amalgamated in 1922 to form the Municipal Borough of Port Talbot. Oystermouth U.D.C. became part of the County Borough of Swansea in 1919.

Before 1894 most of the local authorities were administered by Local Boards of Health. The Ancient Boroughs of Swansea, Newport, Neath, Llanelly and Aberavon had Borough Corporations.

The housing Services for Llantrisant and Llantwit Fardre R.D.C., Caerphilly U.D.C. and Glyncoirwg U.D.C., commenced before the areas became separate Local Boards. These districts formed parts of very large Boards where administration was carried out on a regional basis. The regions later became independent authorities. Before 1908 the Gelligaer U.D.C. was known as the Gelligaer and Rhigos R.D.C. Llchwyr U.D.C. was formerly known as the Swansea Rural Sanitary Authority and later as the Llanyfelach R.D.C.

Sources of Information.**1. Council and/or Committee Minutes.**

Abercarn, Aberavon, Bedwellty, Blaenavon, Crickhowell, Nantyglo and Blaina, Rhymney, Risca, Tredegar, Swansea (1851-75), Aberdare (1855-1908, 1911 and 1912), Mountain Ash (1867-1902), Abertillery (1881-1911).

2. M.O.H. Reports.**A. Glamorganshire County Council.**

Bridgend, Penybont, Cowbridge R.D.C.

B. Local Authority M.O.H. Reports.

Barry, Swansea (1876-1914), Aberdare (1909, 1910, 1913 and 1914), Mountain Ash (1903-1914).

3. The Clerk of Burry Port U.D.C supplied figures of houses built in that authority's area.

4. All other series except that for Cardiff were obtained from the Plan Registers kept by the Local Authority Surveyors.

5. *Cardiff.*

The information related to years ending 31st August. From November, 1876, information can be obtained from the minutes of the fortnightly Public Works Committee. This information sometimes refers vaguely to "houses" of unspecified number. Even during the years ending 31st August, 1878 and 1879, when these minutes give little hint of ambiguity, the total of 415 and 507 houses, reached by a laborious count of fortnightly information, compare unfavourably with the officially accepted totals of 552 and 585. Because of this no attempt has been made to compile figures for calendar years from the fortnightly data. Instead the published annual figures are given. The sources used are listed below :

1851-1869 M.O.H. Report.

1870 No information.

1871-1881 Appendix to the Minutes of the Waterworks Sub-Committee for 28th July, 1882, which gives a table wrongly headed "New Buildings, etc., erected (sic) in Cardiff." Different kinds of buildings (planned) are shown separately.

1876-1881 Appendix D to the "Memorial in reference to the proposed University College, to be presented to The Right Honorable Earl Spencer, K.G., and the Right Honorable A. J. Mundella" printed in the Minutes of February 13th, 1882. These data of plans approved check with those in the source above, except that the 1876 figures for houses is given as 473 and that for shops as 40 ; and the 1878 houses and shops figure as 573. The figure in our table are those given in the Waterworks Appendix.

1882-1889 M.O.H. Report, 1889, where the figures are printed as "houses and shops built." The M.O.H. Report incorporated in the Minutes of the Health and Port Sanitary Committees for October 13th, 1885, prints the same figures for 1882-1884, but calls them "plans passed for houses." A "Petition to the President of the Local Government Board, praying that Cardiff might be constituted a County" (Minutes, April 9th, 1888) prints the same figures as "number of houses and shops erected." The figures printed for 1886, 1887 and September, 1887 to March, 1888 are 1601, 1626 and 1600. In the M.O.H. Reports for 1889 and 1892 the figures for 1886, 1887 and 1888 appear as 1201, 1226 and 1062. Since the average figure of "1273.6 for the past five years" quoted in the Petition gives a total nearer to that obtained by accepting the lower figures, these have been used.

1890-1912 M.O.H. Reports, chiefly that for 1912.

Books Received

- BURNS, Eveline M. : *Social Security and Public Policy*. McGraw-Hill Book Company, London, 41/6d. pp. 291.
- BUTLIN, N. G. : *Private Capital Formation in Australia. Estimates, 1861-1900*. The Australian National University Social Science Monographs 5. pp. 166.
- BUTLIN, N. G. & MEEL, H. de : *Public Capital Formation in Australia. Estimates, 1860-1900*. The Australian National University Social Science Monographs 5. pp. 226.
- GADGIL, D. R. & DANDEKAR, V. M. : *Primary Education in Satara District*. Gokhale Institute of Politics and Economics. Publication No. 32. pp. 172. Rs 6 or 9s. or \$1.25.
- GOFFMAN, Irving : *The Presentation of Self in Everyday Life*. University of Edinburgh. pp. 162. 10s.
- MEEK, Ronald L. : *Studies in the Labour Theory of Value*. Lawrence & Wishart, London. pp. 310. 30s.
- PIGOU, A. C. Ed. by : *Memorials of Alfred Marshall*. Reprints of Economic Classics. Kelley & Millman, Inc. pp. 518. \$8.50.
- Natal University of : *A Study of the Family Life of Urban Africans*. The Baumannville Community. Institute for Social Research, Durban. pp. 217.
- SENNHOLZ, Mary. Ed. by : *On Freedom and Free Enterprise*. Essays in Honor of Ludwig Von Mises. pp. 333. \$3.50.
- SENNHOLZ, Hans F. : *How can Europe Survive?* D. Van Nostrand Company, Inc., Toronto, New York, London. pp. 336. 30/-.
- TRIPP, Basil H. : *Renold Chains*. A History of the Company and the Rise of the Precision Chain Industry, 1879-1955. Geo. Allen & Unwin Ltd. pp. 191. 21s.
- VARGOVIC, C. A. : *A Survey of Structural Changes in the Western Australian Economy*. A Statistical Interpretation. The University of Western Australia Press. pp. 109. 8/6d.
- WAASDIJK, T. Van : *Hire Purchase Credit in South Africa*. An Economic Survey. Witwatersrand University Press. 168 pp. 21s.
- WIESER Friedrich Von : *Natural Value*. Reprints of Economic Classics. Edited with a Preface and Analysis of William Smart. Kelley & Millman Inc., New York, 1956. pp. 243. \$7.50.

